METALLOGRAPHIA

WEBSTER

1671

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WEBSTER, John

METALLOGRAPHIA:
OR,
AN HISTORY
OF
METALS.

Wherein is declared the ſigns of Ores and Minerals both before and after digging, the cauſes and manner of their generations, their kinds, ſorts, and differences; with the deſcription of ſundry new Metals, or Semi-Metals, and many other things pertaining to Mineral knowledge.

As alſo, The handling and ſhewing of their Vegetability, and the diſcuſſion of the moſt difficult Queſtions belonging to Myſtical Chymiſtry, as of the Philoſophers Gold, their Mercury, the Liquor *Alkaheſt*, *Aurum potabile*, and ſuch like.

Gathered forth of the moſt approved Authors that have written in *Greek*, *Latine*, or *High-Dutch*; With ſome Obſervations and Diſcoveries of the Author himſelf.

By JOHN WEBSTER Practitioner in Phyſick and Chirurgery.

Qui principia naturalia in ſeipſo ignoraverit, hic jam multum remotus eſt ab arte noſtra, quoniam non habet radicem veram, ſupra quam intentionem ſuam fundet. Geber. Sum. perfect. l. c. 1. p. 21.

Sed non ante datur telluris operta ſubire,
Auricomos quam quis diſcerpſerit arbore fœtus. Virg. Æneid. l. 6.

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Biſhops-head in St. *Pau's Church-yard.* MDCLXXI.

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To his Highneſs
PRINCE *RUPERT*,
Count Palatine of the Rhyne,
DUKE *of* BAVARIA
And CUMBERLAND,
EARL of HOLDERNESS, &c.
Conſtable of the Royal Caſtle and Honor
OF
WINDSOR,
And KNIGHT of the Noble Order
OF THE
GARTER.

May it pleaſe your Highneſs,

I Have not preſumed to preſent this mean and ſlender Collection of Minerals unto your Highneſs view, forth of confidence of its own worth; though there may be ſome things in it not unfit for the knowledge of ſo High and Noble a Perſon: But rather in reſpect of the tranſcendent worth of the Subject it treateth of, being the moſt abſtruſe and moſt excellent part of all Natural Philoſophy; being hereunto eſpecially moved by two reaſons. One is, That your Highneſs being a Member of the Royal Society (one of the happy fruits of His Majeſties bleſſed and miraculous Reſtauration, and that which will ſpeak him glorious to all ſucceeding Generations, beyond all his Royal Progenitors) ſtands thereby in ſome meaſure obliged to be an encourager, and cheriſher of all attempts (though of the loweſt and meaneſt perſons) that tend to the advancement of Experimental Philoſophy. This (may it pleaſe your Highneſs) did heighten my hopes, that I might receive the ſame candor (in ſome meaſure) that your Highneſs ſeemeth to have afforded to all. Another is the propenſion, and inclination that (as I am informed) your Highneſs bears in a particular manner to this worthy and commendable Science of Minerals and Metals. The onely thing (beſides the craving pardon for my boldneſs) is, that I humbly beg of your Highneſs, that if your ſpare hours will allow, you may ſometimes make a peruſal of it, and if your Highneſs be pleaſed to put to your helping hand, that this kind of knowledge may be more heedfully ſought into, and promoted, and that others of far greater abilities, may communicate ſome part of their knowledge, it is all that is deſired by

Your Highneſs's

moſt humble

and devoted Servant,

Jo. Webſter.

The PREFACE.

Courteous Reader, Expect here no flouriſhing Frontiſpiece to allure thee to the buying of this untrim'd and unpoliſhed piece, no not ſo much as the Authors Picture, who never yet was ſo far in love with his earthly Tabernacle, as to be at the charges to have the reſemblance of it drawn, or cut in Copper. Thine own deſire after this kind of knowledge, and the plainneſs of the Subject, are the greateſt motives that I have to lay before thee, to move thee either to buy, or read. The ſtile is low, and plain as the nature of ſuch a ſubject would bear, whoſe harſh and unuſual terms, ſuitable for the moſt part for the Miners themſelves, could not well have admitted of Rhetorick, or more polite Language, had I been furniſhed with any ſuch. And though ſometimes I am forced to uſe more nice and ſubtle expreſſions, they are ſuch as the matter in hand did neceſſarily require, and cannot but be agreeable to ſuch Readers, whoſe underſtandings are capacitated to comprehend the matters treated of.

What Opinions ſoever I offer, whether of mine own, or taken from other Authors, are not to impoſe upon the judgments of any, who am my ſelf no lover of Dogmatizing, and have long wiſhed, and am now moſt glad to ſee a way ſet up for the promoting of Experimental Philoſophy, that Mens judgments may no longer be fettered in Scholaſtick Chains, nor kept always in the Priſons of Academick Opinions. Though I would not here be underſtood to condemn thoſe Syſtems, and Methods of Arts and Sciences, that are neceſſary to the inſtructing of Youth therein, but that they are laudable and allowable, and have their proper and peculiar uſes and benefits, but not ſo far as to ſet a ſtop to farther Diſcoveries by Experiment and Obſervation, eſpecially in Natural Philoſophy; for all the knowledge (doubtleſs) that is yet had, is but a ſmall part of that which may be known, and lies yet undiſcovered, or found out.

There are two main things that I have aimed at in this Work. 1. The one is, that ſeeing there is little extant in our *Engliſh* Tongue, concerning Metals or Minerals, the ſigns of finding, and diſcovering of them, or of their Generations, Growth, Properties or Differences, nor of many other things pertinent to this kind of Knowledge: I thought it might be both an acceptable and beneficial matter to communicate publickly what either by reading I had collected, by converſe learned, or by obſervation found out, concerning Mineral or Metallick Knowledge, unto our Engliſh Miners and others that have a deſire to underſtand theſe things, and yet are not capable of the Latin or German Tongues, in which the greateſt part of this Knowledge is written. And this being as it were the chiefeſt of mine aim, I hope my Country-men will take it thankfully, and in good part, though it be wonderfully far ſhort of what may be deſired and expected about this ſubject.

2. Another main end that I have had in publiſhing of this poor piece of collected Learning, is ſimply (as far as I am able) to promote Metallick Knowledge, and eſpecially to excite others that have had far better and greater advantages to inſtruct and inform themſelves, than I that have always lived in a private, obſcure, and troubled con-

dition; and doubtleſly know much more than ever I can juſtly challenge or appropriate to my ſelf; which if it may occaſion, or gain this end, I have a great part of my wiſhed deſires.

I have alſo diſcuſſed ſome things of the higheſt pitch about myſtical Chymiſtry; which if I be cenſured for, I am contented, and ſhall uſe no other defence but ſilence and patience: For I too well know how that kind of Learning finds entertainment in the World: But there are none that are bleſſed with any meaſure of that noble, true, and moſt true Science, but they have learned little to weigh the Judgments and Cenſures of the ignorant and envious. And however others may judge, they that do underſtand will be ſatisfied with what particulars I have declared; and that is all that I deſire or wiſh for.

But if any object, and ſay, that this is little, but only a Collection and Tranſcription of what others have written upon this ſubject: We ſhall confeſs it; for it is not poſſible that one private perſon that hath been no great Traveller, nor ſeen any Mines but thoſe of his own Nation, and not the moſt of them neither, ſhould be able experimentally to comprehend all that is neceſſary to this kind of Knowledge. Yet hath the Reader two benefits hereby: one is, that thoſe things that lie diſperſed in many and ſeveral Authors, are here as it were contracted, and for the moſt part brought to their heads or kinds, whereby with leſs labour and pains, and the ſparing of much coſt in buying many Authors, the Reader may come to ſome meaſure of Mineral Knowledge. Secondly, Another benefit is, That the Reader may find the marrow of what other Authors have written in other Languages, repreſented in his Mothers Tongue: as alſo, here are many things of my own Obſervation that may be conducible to advance this kind of Learning.

Again, I have here given an enumeration of the moſt conſiderable Authors that have written of Metals and Minerals, with a moderate Cenſure upon them; whereby the Reader may be enabled to make his choice of ſuch of them as he liketh beſt, and may be indifferently inſtructed how to judge, or account of the moſt of them; which is a matter of no ſmall concern.

If any ſeem offended that I have given too great Commendations to *Paracelſus*, *Helmont*, *Baſilius*, and ſome other of the Adeptiſts, they may know that it is not without juſt cauſe, though they underſtand them not: for chewed meat muſt not always be put into mens mouths, let them ſtudy to find forth the depth of the meaning of thoſe Authors, and then they will judge as I have done, and will confeſs that far leſs praiſe is given unto them than they have juſtly deſerved.

I have alſo ſometimes given the Authorities quoted in the Language and words of the Author; ſometimes have rendred them into the Engliſh, not ſo much regarding the Grammatical Order, as the ſenſe of the Author; and for the moſt part the Book and Folio noted in the Margent: ſo that however, if the Reader doubt or diſlike, he may have recourſe to the Authors themſelves, and conſult them in their own words, or in other Tranſlations, if there be any.

Laſtly, I have mentioned divers ſorts of Ores, that poſſibly ſome of them might be found in *England* or *Scotland*, as of Antimony, Tinglaſs, Spelter, Talk, and Cinnober;

which if the diligent Miner would ſeek carefully after, the ways of refining and purifying of them might eaſily be found forth, and thereby no ſmall advantage be brought to the Nation in general, and to the poor Miners in particular. And this is all that I think good to offer by way of Preface, the Work may ſpeak for it ſelf without further Commendation. And I hope the Reader will take it in good part, at leaſt until ſome abler Pen ſhall publiſh ſomething concerning this ſubject in our Engliſh Tongue, that may be of greater worth and utility. Farewel.

A Regiſter of the Chapters.

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METALLOGRAPHIA:
OR,
An HISTORY of METALS.

CHAP. I.

Of the uſefulneſs and excellency of the Knowledge of Minerals and Metals, and of the antiquity of the Melting, Refining, and accommodating of them to humane uſe, and the cauſes of the non-proficiency of Metallick skill, eſpecially in his Majeſties Dominions of Great Britain.

THe uſefulneſs and excellency of the knowledge of Minerals is fully deſcribed by that learned and induſtrious perſon *Joſephus Acoſta*, who ſaith, The Wiſdom of God hath made Metals for Phyſick, and for defence, for ornament, and for inſtruments for the Work of men. What great benefit the Mineral Kingdom doth yield in the Art of Medicine, for the curing both of internal and external diſeaſes, the Authors (as *Dioſcorides* and *Matthiolus*) that have written largely *de materia Medica*, as alſo the whole Band of the Chymiſts, both myſtical and vulgar, do ſufficiently teſtifie. So

Hiſtor. Jud. lib. 3. c. 2. p. 205.

that ſome have thought that an whole Apothecaries ſhop might be furniſhed forth of *Vitriol* alone; and *Helmont* (quoting *Paracelſus*, which he ſeems to approve of) that 200 Diſeaſes (perhaps) might be cured with Preparations made forth of Lead. And for the other benefits that this knowledge hath brought to mankind, both for War (which ſince corruption entered the nature of man, could not be eſchewed, either in the offenſive or defenſive part) and Peace, are ſo many and ſo great, that there are none ſo ignorant that are not ſenſible thereof. So that in a manner the well-being of mankind would be much deficient if this Mineral skill had not been found out, exerciſed, and improved; as almoſt all Trades, Artificers, and Families can ſufficiently teſtifie.

Gen. c.4. v.22.

And therefore we find this Skill was (neceſſity compelling) found forth in the firſt Ages of the World, *Moſes* teſtifying that *Tubal-Cain* was an inſtructer of every Artificer in Braſs and Iron. And as *Junius* and *Tremellius* render it, *qui erudivit omnem fabrum ærarium & ferrarium*: and *Sebaſtian Caſtalion* gives it, *omnis ærarii & ferrarii opificii fabricatorem*: and the Vulgar Latine renders it, *qui fuit malleator & faber, in cuncta opera æris & ferri*: and *Arias Montanus* gives it, *acuentem omne opificium æris & ferri*: And the learned *Piſcator* ſeems to incline to render it *acutorem (ſeu politorem) patrem (ſive auctorem) omnis fabri ærarii ac ferrarii*. I have given theſe ſeveral Tranſlations, becauſe ſome would have *Tubal-Cain* not to have been the firſt that diſcovered Mines and Metals, nor to have found forth that part of Chymiſtry that teacheth the fuſion and refining of them, but onely to have been the Inventer and Teacher of making inſtruments forth of Braſs and Iron; and then the diſcovering, digging up, and purifying of Metals muſt have been before his time, and ſo more ancient. Others aſcribe unto him both the diſcovery, digging up, and refining of them, as alſo the framing of ſundry inſtruments forth of them (which is moſt probable) as our Countryman *Joſhua Silveſter* in his Tranſlation of *The Divine Weeks and Works of the learned Du Bartas*, who ſingeth thus,

Part.4. Week 1. p. 289.

While through a Foreſt Tubal *with his Yew*
And ready Quiver did a Bore purſue,
A burning Mountain from his fiery vain,
An Iron River rolls along the Plain.
The witty Huntſman muſing, thither hies,
And of the wonder deeply can deviſe.
And firſt perceiving that this ſcalding mettle
Becoming cold, in any ſhape would ſettle,
And grow ſo hard, that with his ſharpened ſide,
The firmeſt ſubſtance it would ſoon divide.
He caſts an hundred plots, and ere he parts,
He moulds the ground-work of an hundred Arts, &c.
For now the way to thouſand works reveald,
Which long ſhall live, maugre the rage of Eld.
In two ſquare creaſes of unequal ſiſes,
To turn two iron ſtreamlings he deviſes.
Cold, takes them thence: then off the droſs he rakes,
And this an Hammer, that an Anvil makes:
And adding Tongs to theſe two inſtruments,
He ſtores his houſe with iron implements, &c.

Vid. Libavi Alchym lib. 1. c. 1.

So that whether way ſoever it be taken, it is apparent that the diſcovering of Mines and Metals, their digging up, refining, and ſundry uſes of them are very ancient, if not more then many other Arts now extant in the World. And though it be not mentioned in Holy Writ, that in thoſe days Medicines were prepared forth of them, yet it is no ſolid conſequence to affirm that they were not, for many things were both invented and uſed, of which there is no poſitive mention in the Scriptures. And however *Couringius* with all his bitterneſs, the Catholick Tranſcriber and Rhapſodiſt *Athanaſius Kircherus*, with all his querks, and *Guibertus* with his ignorance and malice may imagine, it is manifeſt that Chymical or Hermetick Phyſick was very ancient, as we in a few arguments (though digreſſively) ſhall prove and evince.

1. The great queſtion is, Whether the Egyptian Learning was anciently in any great requeſt, eſpecially in this point of curing Diſeaſes. 2. And whether Chymiſtry was not ancient in reſpect of preparing Medicines forth of Metals and Minerals.

1. That the Egyptian Learning in Phyſick and Metals appeareth thus. 1. We find *Gen. c.*41. *v.*42. theſe words: *And Pharaoh took off the ring from his hand, and put it upon Joſephs hand, and arraied him in veſtures of fine linen, and put a gold chain about his neck:* from whence it is plain that the Egyptians in that time had either the knowledge of finding of Metals, or had them brought from ſome other Countries, but however had the skill of melting of them, and curious framing of them, elſe they could not have made (as may rationally be ſuppoſed they did) ſuch valuable, and choice things as Rings and Chains of gold. And this Art could not in a moment or on the ſudden be learned of them, or ariſen up amongſt them; for

nothing is invented and perfected at one and the ſelfſame time; and this ſufficiently proveth that they had skill in that part of Chymiſtry that teacheth the fuſion and purifying of Metals.

2. A ſecond Argument is, in this Text, *And Joſeph commanded his ſervants the Phyſicians, to embalm his father: and the Phyſicians embalmed Iſrael. And forty dayes were fulfilled for him (for ſo are fulfilled the dayes of thoſe which are embalmed) and the Egyptians mourned for him threeſcore and ten dayes*: and *Joſeph* was embalmed alſo. From whence it is apparent that they had Phyſicians thus anciently in *Egypt*; and that they had no other skill but onely to embalm, were abſurd to imagine, or to think they were not verſed in curing diſeaſes, and ſo were furniſhed with medicines both from the Animal, Vegetable, and Mineral Kingdoms. If their Learning had not been great in this point as well as in Politicks, Arithmetick, Geometry, and Aſtronomy, the compariſon betwixt *Solomons* wiſdom and theirs had been fondly aſſerted by the Text that ſaith, *And Solomons wiſdom excelled the wiſdom of all the children of the Eaſt country, and all the wiſdom of Egypt.* From whence we may note, 1. That the Text would not have ſaid that *Solomons* wiſdom had excelled the wiſdom of the children of the Eaſt, and all the wiſdom of *Egypt*, if the wiſdom of the Eaſt, and of *Egypt* had not then been accounted the greateſt wiſdom known in the world. 2. This wiſdom of the Eaſt and of *Egypt* was not ſuch as like a *Muſhrom* muſt ſtart up in a night and an age, but muſt neceſſarily in reaſon be ſuppoſed to have had a beginning, an encreaſe long ere it could come to that height to be eſteemed the greateſt in the world, and then muſt

Gen. c. 50. v. 2, 3, 26.

1 King. c. 4. v. 30.

muſt needs have been of a long and large antiquity before the days of King **Solomon.** 3. And that it ſhould be then accounted the greateſt wiſdom in the world, and yet to be defective both in that part of the Theory of Natural Philoſophy, which of all is the moſt noble; and eſpecially in that part of the Practick, the Art of Medicine, or Curing Diſeaſes, and meliorating of Metals, were indeed to mutilate the wiſdom of **Solomon**, and to make him not only ignorant in the moſt ſecret and noble parts of natural knowledge, but alſo to have been moſt miſerable, in not being able to cure the infirmities of the body; which cure being wanting, the comfort of all other earthly joys doth vaniſh and flie away. 4. And what ſhould **Solomons** skill have been accounted to excel theirs (for the excellency is chiefly put in his knowledge of natural things) being ſo knowing in the nature of all Vegetables, that he was able to diſpute of all Plants and Trees, from the Cedar of *Lebanon* even unto the Hyſſop that ſprings forth of the Wall: And to know the nature of all living Creatures, as Beaſts, Fowls, creeping things, and Fiſhes: if by all this he knew not to preſerve health and cure diſeaſes, and eſpecially to be ignorant of the nature of the things contained in the Mineral Kingdom; or underſtood not the great Arcana's and Medicines that might be drawn from them, and lay hidden in them: and if he excelled them in all theſe (as doubtleſs he did) then the knowledge of the children of the Eaſt, and of the Egyptians in all theſe things, was not little or of ſmall account. 5. Why ſhould **Solomon** ſend to **Ophir** for gold, and to make at *Jeruſalem* ſilver and gold as plenteous as ſtones: if it were for nothing but for vain glory and covetouſneſs;

1 King. c. 4. v. 33.

2 Chron. c. 1. v. 15.

neſs; what wiſdom was this, any but that which was earthly, ſenſual, and deviliſh? and not that which as a bleſſing was given to *Solomon* by the Almighty. 6. But if we may believe that piece (though reckoned among the Apocrypha) called *the Wiſdom of Solomon*, we may hear him thus confeſſing: *Wherefore I prayed and prudence was given me, I prayed and the ſpirit of Wiſdom was beſtowed upon me.* And he eſteemed gold in compariſon of it, as ſand: and acknowledgeth that by it he had innumerable riches, and that thereby he knew the framing of the World, and the vertue of the Elements, and whatſoever was hidden and manifeſt, that he knew. From whence it is plain that he was not ignorant of the moſt ſecret vertues both of things occult and manifeſt, and ſo could not but underſtand the nature and vertues of the Mineral Kingdom, otherwiſe he had not excelled the children of the Eaſt, nor the Egyptians, whoſe skill could not be little in theſe things.

Wiſd. c. 7. v. 7, 8, 9, 17, 21.

3. Another Argument appeareth from the Text. *And Moſes was inſtructed* (or inſtituted from a child) *in all the learning of the Egyptians.* For though *Moſes* after his nurſing was brought to *Pharaohs* daughter, and brought up as her ſon, yet was it well known unto his Mother who had nurſed him, that he was her own child; and therefore it is not rational that ſhe, his father, and the reſt of the Hebrews would ſuffer him to be brought up ſo with *Pharaohs* daughter, as thereby to deſtroy the principles of his Religion (in which no doubt they had a ſpecial care to inſtruct him) being therein as zealous as any people under heaven. And therefore his being inſtructed in all the Learning of the Egyptians, it is in

Herm. Medic. c. 11. p.97,98.

Mat.c.2.v.1,2.

Vid. D Thom. Aqu. Catenam auream ſuper loc. cit.

reaſon to be conjectured, that it was not in vain ſuperſtitious Magick (wherewith as *Couringius* laboureth to prove, they were much infected) but in the laudable Sciences of Arithmetick, Politicks, Geometry, Aſtronomy, and their Hieroglyphick learning, which doubtleſs contained natural and lawful Magick (ſuch as thoſe Magicians were partakers of, that came to worſhip Chriſt, whoſe learning all the Fathers and Interpreters do juſtifie to be good, natural, and lawful) the Art of Medicine, and knowledge of natural and artificial things, as in the next Branch we ſhall more at large make appear.

2. We ſhall now prove that Chymiſtry is (though perhaps not under that name, for of the Original of that title we may juſtly doubt) but in its nature and property, as an Art that taught the preparing of Medicines forth of Minerals as well as other things, thereby to cure diſeaſes, and to preſerve health.

1. And firſt it is ſufficiently proved that the Learning of the Eaſtern Nations, and of *Egypt*, was great; to which we ſhall add ſome more teſtimonies from ſuch ancient and approved Authors as are of the greateſt authority and veracity, and then urge the Conſequences, and anſwer the main Objections.

De Cœlo lib.2. c.12. p.286.

Concerning ſome part of the great Learning of the Egyptians, hear *Ariſtotle*; who ſaith, ſpeaking of the Stars: *Similiter & de cæteris ſtellis Egyptii & Babylonii dicunt, qui plurimis jam annis ante hæc obſervaverunt, & à quibus multa fide digna de ſingulis ſtellis accepimus.* And in like manner of the reſt of the ſtars the Egyptians and Babylonians have ſpoken, who had many years before obſerved them, and of whom we have received concerning all the ſtars, many things worthy of credit.

De Finibus lib.5.p.153.

The next Authority we ſhall urge, is the Teſtimony of *Cicero*; who ſaith, *Quid de Pythagorâ? Quid de Platone aut Democrito loquar? à quibus propter diſcendi cupiditatem, videmus ultimas terras eſſe peragratas?* What ſhall I ſay of *Pythagoras?* what ſhall I ſay of *Plato*, or *Democritus?* of whom, for the earneſt deſire of Learning, we have ſeen the furtheſt Lands travelled over. And again, *Philoſophiæ denique principes ipſius, nunquam in ſuis ſtudiis, tantos progreſſus ſine flagranti cupiditate facere potuiſſent; ultimas terras luſtraſſe Pythagoram, Democritum, Platonem, accepimus. Ubi enim quid eſſet, quod diſci poſſet, eo veniendum judicaverunt.* Laſtly, The Princes of Philoſophy it ſelf, never could have made ſo great progreſſes in their ſtudies, without a burning deſire. We have received that *Pythagoras*, *Democritus*, and *Plato* had viewed the fartheſt Lands: for where there was any thing to be learned, they have judged it fit to go thither.

Tuſcul.quæſt. lib.4.p.236, 237.

Macrob. lib. 1. Saturnal. c.15.

Another Teſtimony take from *Macrobius*, who ſaith, That *Egypt* was the Mother of all Arts. And again, That the *Egyptians* were the Parents of all the Diſciplines of Philoſophy: which is confirmed by *Strabo*, an Author of unqueſtionable verity; by *Herodotus*, and by *Diodorus Siculus*. To theſe add the words of *Philo Judæus* in his Book *De vita Moſis*: who ſaith, that their Learning conſiſted in Arithmetick, Geometry, Muſick, and Hieroglyphical Philoſophy; *vid. Iamblic. de vit. Pythag. l. 1. c. 29. Diog. Laertium, p. 182. & Orig. Sacr. p. 122. &c.*

Geog. lib.17. Herodot.l.2. Diod.Sic.l.1.

From all this we ſhall onely draw theſe Deductions:

1. That if the Learning of the children of the Eaſt,

and the Wiſdom of *Egypt*, were in **Solomon**'s time accounted the greateſt that then was known, and that *Solomon*'s excelled them both; then it cannot rationally be conceived that either of them were defective in the moſt noble parts, either of Natural Philoſophy, or the Art of Medicine drawn from the Mineral Kingdom, nor the Art of Tranſmutation, but that they underſtood both.

2. *Ariſtotle*, (accounted the Prince of Learning, and of as much Antiquity as the moſt Authors we have) would never have ſo much commended the Egyptians and Babylonians for the truth of their Doctrine concerning the Stars; but if they were ſo well verſed in the nature of things ſo remote as the Stars, they muſt (in all probability) be as much (if not better) skill'd in the knowledge of the nature of the ſubterraneous Kingdom.

3. *Cicero*, a perſon that writ above 1600 years ſince, would never have ſo remarkably taken notice of *Pythagoras*, *Democritus*, and *Plato* for travelling into the remoteſt Regions, and eſpecially into *Egypt*, they knowing the height of the Græcian Learning, and being therein, by the account of all Authors, the chiefeſt Maſters, if there had not been ſome excellency in the Egyptian Learning that they were ignorant of. And what could that be except the Art of Tranſmuting of Metals, and of curing diſeaſes in a more perfect way then the Græcians knew; amongſt whom notwithſtanding the *Æſculapian* Family had been famous many hundred years before the time of *Pythagoras*, and thoſe that followed him and their going down into *Egypt*?

4. And if *Egypt* was (according to *Macrobius* and

the reſt quoted before) the Mother of all Arts, and the Parent of all the Diſciplines of Philoſophy; then ſurely they could not be ignorant of that which is the moſt noble of all Arts, the Tranſmutation of Metals, and the curing of all diſeaſes by an univerſal Medicine, which is no where to be had but forth of the Mineral Kingdom.

But their chief Objection is, that Chymiſtry (about which name we do not contend, but about the Art it ſelf) is but of late invention; and that the learning attributed to *Hermes Triſmegiſt*, is but of late years ſtanding, and both the Author, and it but forged and feigned. To which we anſwer,

1. *Couringius* (the moſt bitter Enemy that ever the Hermetick Learning, or that *Hermes* had) doth confeſs, that from moſt ancient Times the Art of Medicine was had in eſteem in *Egypt*; and ſaith, That the Art of Medicine had been in moſt high eſteem with the Egyptians, ſeeing it was manifeſt by the teſtimonies of their own Country and of others, greater then all exception. For that in the Age of the Patriarchs *Jacob* and *Joſeph*, there wanted not Phyſicians, by whoſe care their dead bodies were (being embalmed) preſerved from putrefaction; but that afterwards the ſame was practiſed by others, as might be gathered by thoſe things that are related of the Egyptian Funerals, by *Herodotus* and *Democritus*. By whoſe confeſſion it being granted that the Medical Art was ſo anciently practiſed there; and that according to *Pliny*, they affirmed that the Art of Medicine was invented amongſt them, and all their Arts commonly attributed to *Hermes*; then it muſt of neceſſity follow, that *Hermes* (though there might be, and by the teſti-

Couring. de Herm. Med. c. [illegible] 77.

Plin. lib. 7 c. 56

mony of *Cicero* were divers of that name) was not a feigned Author, nor the Art forged, but was of ſuch antiquity, that no vain Arguments can eaſily overthrow.

Libanii lib. Alchym. Tranſ. Defenſ. 2. p. 214.

2. The Teſtimony of *Suidas*, though undervalued by *Couringius* and *Guibertus*, is not of the leaſt validity: who relateth, That *Diocleſian* had cauſed to be gathered all the Books that treated of Chymiſtry amongſt the Egyptians, and cauſed them to be burned, leſt growing rich by the Art of Tranſmutation, it might incourage them to rebel. Now *Diocleſian* came to the Empire, or reigned about the Year of Chriſt, 288. or as ſome, 287. or as *Baronius*, 284. and *Suidas* lived about *Ann. Chriſt.* 1214. ſo that the Name and Art of Chymiſtry muſt needs have been both known before the time of *Suidas* writing. And *Cælius Rhodigines*, an Author of great authority and general Learning; the *Collegium Conimbricenſe* are perſwaded that he writ the truth. And this teſtimony *Demetrius Chalcocondyles* giveth of the Writings of *Suidas*. This Book, to wit of *Suidas*, doth not onely bring manifold profit to young Students, but alſo great fruit and pleaſure to perſons of every Age. For neither doth he onely interpret the words of Hiſtorians, Orators, and of all ſorts of eloquent Authors, but he alſo comprehendeth many and various Hiſtories, that are not eaſily to be found elſewhere, becauſe the Books of the Græcians, Romans, and Hebrews, from whence they were taken, are loſt and periſhed. Which Teſtimony of the Writings of *Suidas*, the concurrent Opinion of all learned men for above the ſpace of 400 years, is a far greater evidence then ever the authority of *Guibertus*, or *Couringius* is able to invalidate.

Libanii ibid. p. 217.

3. *Con-*

3. *Couringius* and *Guibertus* both do confeſs that *Julius Firmicus* the Aſtrologer, who lived in the time of *Conſtantine* the Emperour, about the year of Chriſt 320. did attribute a good or bad Conſtellation in Heaven to the Profeſſors of Alchymie. By which it is plain that the Profeſſion of that Art muſt have been long known before; for it is a rule, that *Rei non exiſtentis, aut incognitæ nulla eſt aſſignatio*; That of a thing not exiſting, or unknown, there can be no aſſignation. And ſeeing that *Firmicus* was a moſt ancient Aſtrologer, and that Aſtrological Obſervations do ariſe from long Experience; it muſt neceſſarily follow, that Alchymy muſt needs be both *Re & Nomine*, of far greater antiquity then the days of *Firmicus*.

Libanii ibid. p.217.218.

Couring. l. de Herm. Medic. p. 62,93,137.

4. *Guibertus* himſelf brings an example forth of *Cedrenus* of one Profeſſing Chymiſtry, that was a Magician (in the worſt ſenſe he meaneth.) Now *Cedrenus* writ in the time of *Anaſtaſius* the Emperour, who reigned about *Ann. Chriſt.* 491. And if then there were ſome that profeſſed Chymiſtry, then it muſt needs have been of a more ancient ſtanding. For there is no Profeſſion that upon a ſudden doth get root, and paſs into an habit; but muſt have a time of its invention, increaſe, and perfection; ſo that it is plain that both the Art of Chymiſtry and the Name was very ancient. And to this might be added, That the Writings of *Hermes Triſmegiſt* were long extant in the World before the Times of Chriſtianity, otherwiſe it could not be imagined that the Chriſtians for the advancement and defence of their Religion, ſhould have forged ſuppoſititious pieces under *Hermes* his name, but that his Reputation and Learning had been long, and then was of great account amongſt the Heathens themſelves.

Liban. ut ſupr. p.242.

5. Alſo it is manifeſt that Chymiſtry was ancient, becauſe it had flouriſhed long before the times of *Avicen*, *Bulcaſis*, *Meſue*, *Rhaſis*, and the reſt of the Arabians, who could not have mentioned it, if it had not had a beginning before their Age and Time. To this I ſhall onely joyn the Teſtimony of *Morienus* a Roman Hermit, whoſe Writings were tranſlated forth of the Arabick Language into Latine, *Ann. Ch.* 1182. who learned the Art of Tranſmutation, or of the great Elixir at *Rome* of *Adfar* an Alexandrian, and a Chriſtian. And afterwards *Morienus* taught it to *Calid* or *Evelid*, the ſon of *Gizid* the ſecond, who was King of *Egypt* about the year of Chriſt 725. which doubtleſs *Adfar* had learned forth of the Writings of *Hermes Triſmegiſt*; which do all plainly prove that Chymiſtry, for the Hermetick Learning was of ſufficient antiquity, and *Hermes* himſelf no feigned Author.

Liban ut ſupr. p.217.

6. I ſhall onely add the judgments of four or five Authors of unqueſtionable credit and veracity.

1. And firſt the moſt learned *Sennertus*, a great Chymiſt and Galeniſt, a perſon generally approved of by all, (though otherwiſe a moſt virulent adverſary of *Paracelſus*) doth confeſs in theſe words; *Fuit enim hæc ars (nempe Chymia) jam uſque ab Hermete Triſmegiſto ſacerdotibus Egyptiis familiaris, & nota.* This Art (to wit, Chymiſtry) was even from the time of *Hermes Triſmegiſt*, familiar and known to the Egyptian Prieſts. What can be more clear and manifeſt for the antiquity of this Art, and for *Hermes* himſelf, then this Teſtimony of ſo learned a perſon? And again, after a long diſcourſe of the antiquity of Chymiſtry, and of *Hermes* himſelf, who he conceives to have

D. Sennert. Tom.1.c.1.de Nat.Chym. p.754.

have lived about the year of the World 2000. becauſe that *Diodorus Siculus* writeth, that *Iſis* had engraven in the Pillar of her Sepulchre, that ſhe was inſtructed or taught by *Hermes*; he concludeth thus, *Chymiam ipſi (ſc. Hermeti) notam fuiſſe facile concedimus: quid tamen in ea præſtiterit, ex hiſtoriis non patet.* We eaſily grant that Chymiſtry was known to *Hermes*, but what he performed therein is not manifeſt from Hiſtories.

Id. Tom. 3. lib. de Conſ. & diff. uſ. Gal. & Chym. c. 3. 70 71.

2. The ſecond we ſhall commend unto the Curious, is the learned and approved *John Langius*, who in that Epiſtle of his of *the Original of the Art of Medicine* amongſt the Egyptians, Chaldæans, Græcians, and Arabians; as alſo in his next concerning the Libraries of the Art of Medicine, of the Ancients and of other Faculties, doth (in this point) give moſt ample and full ſatisfaction.

Jo. Lang. Ep. Med. l. 2. p. 522. & p. 550.

3. The third that I ſhall name, is the judicious and learned *John Heurnius*; who ſaith, that the Art of Medicine was ſaid firſt to ſpring up amongſt the Egyptians: and reaſon agreeth thereto, becauſe the chief axioms of the Art of Medicine did flow from them: and quoteth the Teſtimonies both of *Hippocrates* and *Ariſtotle*; unto which for brevity, I refer the Reader.

Jo. Heurn l. 1. Inſt. Med. c. 1. p. 1.

Fr. Patric. l. Herm. Triſm.

4. The two laſt I ſhall onely name, and thoſe are *Franciſcus Patricius*, and *Machael Mayerus*, both ſolid and learned perſons, and have written ſo much (in this point) as may ſatisfie any unbiaſſed and impartial Reader.

Mich. Mayer. Symb. Aur. Menſ. l. 1. p. 56. &c.

Now though the knowledge of Metals be of ſuch benefit to the well-being of mankind, and the invention of ſo great antiquity, yet hath it amongſt the generality of the Learned, found no great entertainment, nor has been brought on to any great perfection. For but that ſince and about the time of *Paracelſus* it hath been revived and reſtored, and now begins exceedingly to flouriſh; otherwiſe before it either was by Tradition (eſpecially the myſtical part) delivered over from hand to hand, and ſo kept lock'd up in the breſts of a few myſtical Authors or Adeptiſts; or in their Writings delivered ſo darkly and obſcurely, that the moſt were deterred from taking pains to read or ſtudy them: and of thoſe few that bent their labours that way, ſcarce one of a thouſand did perceive or underſtand their manner of Ænigmatical and Parabolical Writing and Expreſſions; ſo that for the moſt part, until the time aforeſaid, the knowledge of Chymiſtry lay buried in the Cells of the Friers and Monks, and ſo came to no great improvement nor perfection.

And the Reaſons of the non-proficiency of the knowledge of Minerals and Metals in general, we conceive to be theſe principally.

1. That whereas the Animal and Vegetable Kingdoms, in their Generations, Growth, Operations, and Properties, lay viſible and obvious, that every diligent Obſerver and Searcher might dive thereinto; yet hath the knowledge of all thoſe particulars not yet attained to any ſuch degree of perfection, but that the moſt neceſſary and ſubſtantial points are yet undiſcovered or not found out. Now the progreſs of Nature in the generation of Metals and Minerals, their properties and alterations, being a thing that lay hid in the bowels of the Earth, whereinto the ſenſes of few men could pierce; and ſo exceeding difficult to ob-

obſerve or underſtand, that it is no great marvel that ſo little progreſs is made into that kind of Knowledg; for where obviouſneſs and eaſineſs are awanting to know the Subject and the Properties thereof, men commonly have no incitements or incouragement to ſearch after the knowledge of ſuch matter, and therefore muſt needs be a great *remora* or ſtop to the progreſs therin.

2. Again, Though moſt Countries that are not extremely barbarous, do produce within the compaſs of ſome circuit of years, Men learned, and ſtudious of the ſecrets of Nature; yet every Region doth not produce ſuch ſtore of Minerals, as may afford either a fit ſubject, or opportunity for ſuch diſquiſitions, and therefore ſearching minds, either diverted themſelves to inquire into other parts of Nature, more near and eaſie to be obſerved, or elſe betook themſelves to general contemplation; and ſo framed Syſtemes according to their own fanſies, rather drawing Nature to follow their Conceptions, then by travel, labour, long toil and experimental Obſervations, to order their ſpeculations according to the truth of Natures operations; or elſe fall down with that ſcantling of knowledge in theſe things that they found written by other Authors, that had preceded them. So that thereby this kind of Learning was brought to a ſtand, and had its *ne plus ultra* ſet upon it. And it had ſtood ſo ſtill, had not ſome perſons of more inſatiable deſire of the knowledge of the ſecrets of Nature, and eſpecially of her Mineral Kingdom, with *Herculean* boldneſs, and undaunted reſolution, broken through all difficulties, and adventured great dangers and long peregrinations for attaining the ſame, more (perhaps) then *Jaſon* for the Golden Fleece. And ſuch ap-

Helm. Tartar. Hiſtor. p. 334.

pears plainly *Baſilius Valentinus*, *Bernardus Treviſanus*, *Johannes Pontanus*; and of late *Johannes Agricola* to have been, and eſpecially that indefatigable perſon *Paracelſus*, who when under the twentieth year of his age (having ſeen all the Mines in *Germany*) travelled through *England*, *Scotland*, *Swedeland*, *Denmark*, *Norway*, and into *Ruſſia*, and from thence into the Borders of the *Tartars*; where being taken priſoner, and carried to the *Great Cham*, was from thence conveyed to *Conſtantinople*, and from thence returned home thorow *Arabia*, and ſo to *Venice*. So little doth any danger fright a noble and reſolute mind, when armed with the ardent deſire of gaining knowledge, while other idle Lubbers that dare not adventure from the air of their own Countries, nay ſcarce from the ſmoke of their own fires, think themſelves fit Judges of the labour of others, as competent Judges as *Midas* was of *Apollo*'s Muſick.

3. Another Reaſon I ſhall offer is, That the way and means to diſcover the Nature of Minerals, is not onely difficult and dangerous, but in it ſelf is ſo ſordid, baſe and troubleſome, that the moſt men of parts, will hardly adventure themſelves into the Pits or Shafts where Ores are uſually gotten; nor can indure to ſtay there ſo long, that they can rightly inform themſelves of any thing that may be ſatisfactory to their Inquiries. And the Miners or Workmen (for the moſt part) being but people of the moſt indigent ſort, and ſuch as whoſe knowledge and aims reach no higher then to get a poor living by that ſlaviſh Labour, regard to inform themſelves of no more then what may conduce to ſuch a poor and ſervile kind of living; by which means they are little able to give any learned

man ſatisfaction to thoſe neceſſary Inquiries that might tend to enable him to judge rightly of the Nature of the things in that ſubterraneous Kingdom. And to this you may add, That the Miners (or *Berg-men*, as the Germans call them) have as well as the School-men, Logicians, nay, Mariners, and other Artificers, their peculiar Idiom or Dialect, which none but themſelves, or thoſe that have long converſed with them, are able to underſtand; it being for the moſt part like Heathen Greek, or terms of Conjuring to others: and therefore no marvel if this ſkill have had no greater progreſs.

Now for the ſmall progreſs that is made in Mineral things, either to profit or knowledge, within His Majeſties Dominions of *Great Britain*, is not becauſe they do not abound with diverſe ſorts, both of Metals and Minerals; though according to the Vulgar opinion, they lying ſo far in Northern Latitude, might be thought not to yield any great ſtore; it being commonly imagined that the Southern Climates are moſt fertile of them; but ſome other ſpecial reaſons we ſhall ſhew anon. For it plainly appeareth by the learned Antiquary *Camden*, that *Cornwal* and *Devonſhire* have from Ages long ago abounded with moſt excellent Ore of Tin, which hath ſtored a great part of *Europe* with that Metal, accounted generally the beſt in the World, except that of *Corinthia* or *Villacum*. For ſpeaking of *Cornwal*, he ſaith, *Stannum enim non ſine uberrimo fructu, admiranda copia effoditur, ex quo vaſa domeſtica ducta apud omnes Europæos in menſarum uſu argenteis fulgore comparantur. Incola paſſim nigros lapillos ex quibus ſtannum conflatur, vel effodiunt, vel ex arenis lotis eximunt,*

Camden Brit. p.148.

Diodor. Sicul. l.5 c.8.p.142.

munt, quod in continentem à Britannis priſcis navigiis vitilibus corio circumſutis devehi ſolebat. For Tin is digged up in a wonderful quantity, not without great benefit, of which are made houſhold veſſels for the uſe of Tables through *Europe*, comparable to Silver veſſels in brightneſs. The Inhabitants do every where gather little black ſtones, out of which Tin is melted, or dig them up, or gather them forth of them: which was wont to be carried by the ancient *Britains* into the Continent in Wicker Boats covered with Leather.

Camden. Brit. p.692. And in his Deſcription of *Cumberland*, he declareth plainly the ſtore of Copper Mines that were there, which were conceived to hold ſomething of Gold and Silver, as alſo a Mine of Black Lead, for which we yet want a Latine name, but that of late Dr. *Merrett* hath given it the title of *Nigrica*. And Ibid. p. 497. alſo that in *Darbyſhire* not onely plenty of Lead was found, but alſo the Ore of Antimony, which the aforeſaid Dr. *Merrett* confirms; and ſo of Tin, Lead, Silver Ore, Copper Ore, Black Lead, and divers other Minerals. (Pinax rer. nat. Britan. p.208, 209.) And if we may believe *Holingſhed* (no contemptible Author) there hath not wanted the Ore of Gold, Silver, Tin, Lead, Copper, Steel, Iron, and other Minerals. (Deſcript. of England, c. 11. p. 237.) And Dr. *Jorden* in his learned Treatiſe of Natural Baths and Mineral Waters, ſaith, In *Scotland*, three miles beyond *Berwick*, I found a red Ibid. c. 8, p. 39. ſtone, which I take to be *Minium nativum*, ſeeing *Agricola* makes mention of it in *Scotland*; but by a miſchance could not trie it. And I my ſelf know two places in *Craven*, in the Weſt-riding of *Yorkſhire*, Hiſt. 1. where formerly good Silver Ore hath been gotten: the one is a place called *Brunghill Moor* in the Pariſh of *Slaidburn*, where betwixt 50 and 70 years ſince, Sir *Bevis Bulmer* got good ſtore of Silver Ore, that held about 67 pound *per* Tun, as *Walter Basby* an expert Eſſay or Teſt-Maſter informed me, who was a perſon of at leaſt 76 years of age, and had (as an expert Artiſt) been in the time of King *James* ſent to the Emperour of *Ruſſia* to ſetle the ſtandard of his Coin: where he remaining divers years, and going down to the Borders of *Tartaria* to view the Mines there, was taken priſoner by the *Tartars*, and after redeemed by the *Ruſſian* Emperour, and ſent over into *England*. Where after about the year 1655. he was again brought down with ſome *Londoners*, that then had a Patent for Mines. But they being men neither of free purſes to follow ſuch a Work, nor of skill or government fit to manage ſuch an Enterpriſe, they at laſt deſerted the poor old man, whom I entertained for three quarters of a year, and got ſome of the Ore pick'd forth of the old Rubbiſh of the Works that Sir *Bevis Bulmer* had left (with whom the ſaid old Mr. *Basby* had been an Eſſay-maſter) and cauſed him to make ſeveral Trials; which yielded near to the quantity of Silver in a Tun, as is before ſpecified, though it were none of the beſt Ore.

The other place was within the Townſhip of *Rimmington* in the Pariſh of *Gisburn*, in *Craven*, in the aforeſaid Weſt-riding of *Yorkſhire*, in a field called *Skelkorn*, belonging to one Mr. *Pudſey* an ancient Eſquire, and owner of *Bolton Hall juxta Bolland*; who in the reign of Queen *Elizabeth*, did there get good ſtore of Silver Ore, and converted it to his own uſe (or rather coined it, as many do believe, there being many ſhillings marked with an Eſcalope, which the people of that Country call *Pudſey*'s ſhillings to this *Hiſt.* 2.

this day.) But whether way ſoever it was, he procured his pardon for it, and had it, as I am certified from the mouths of thoſe that have ſeen it. And while the ſaid old *Basby* was with me, I procured ſome of the ſaid Ore that had been formerly left, of which (I looking on) he made ſeveral trials, and I am ſure that I was not impoſed upon by him, nor deceived, but that it yielded in the Tun about 26 pounds. And ſince that time there hath been good ſtore of Lead Ore gotten in the ſame place: but by all the intereſt and means that I could uſe, I could never get from the Workmen any ſuch Ore as had been formerly gotten there; ſo cunning are the Miners, that if they find any Vein of Ore that may contain ſo much of Silver as would make it a Mine Royal, they will not let it be known, but preſently beat it, and mix it with their ſofter Ore, pretending the ore will not melt without the other; being with them a common trick, leſt their work ſhould be taken from them. As alſo I can ſhew the moſt ſeveral ſorts of Ore of moſt Metals (except Gold:) beſides great diverſitie of other Minerals, Stones, and Earth, ſome known, and ſome not known, whereby it may ſufficiently appear that it is not want of Minerals or Metals in his Majeſties Dominions, that hath hindred the growth of this knowledge, but ſome other reaſons, which we ſhall now ſhew.

1. The end that commonly men aim at in digging for Minerals and Metals, is gain and profit: and the impulſive cauſe that moves them to that end, is generally Poverty, Want, Indigency, and conſequently Neceſſity. Now the moſt part, if not all of his Majeſties Subjects of *Great Britain* having wherewithal

to get a comfortable and ſufficient lively-hood, as by Paſturage, Tillage, Profeſſions, Arts, Trades, or Manufactures, have no ſuch neceſſity put upon them as to ſeek for a ſuſtentation by ſuch ſlaviſh and drudgery Work, as men muſt undergo that work in thoſe dangerous and darkſom undertakings, as is neceſſarily performed in the Mines: and therefore it is clear, that in His Majeſties Dominions, few will undergo ſuch ſervitude, that have a better means to live upon.

2. Another reaſon is, the ſmall incouragement that Undertakers, or Workmen have in our Nation, to proceed to undergo ſuch pains and hazards, as neceſſarily they both muſt run that meddle with ſuch matters. For if the Mines be Royal, then for the moſt part, they are careleſly followed, as too much experience hath often verified: and if they belong to particular Lords, then the conditions are for the moſt part ſo hard, that the Undertakers and Workmen can get little profit by them, which cauſeth them often to be deſerted and left. For it is uſual with the Workmen, that if they can hear of another place where they may find better Wages, both to leave the Work and their Maſters. And often it hapneth that either divers Lords are at variance about the ſame Mine, or that divers pretend ſeveral Grants, that while they are trying their titles, the Work is neglected, and the Workmen betake themſelves to ſome other Work. Or that where a Mine is diſcovered, that may leſſen the price of the Mineral or Metal that another gets; the Workmen of the one is hired away by the other, or ſome other ſiniſter means uſed betwixt them; as often is the overthrow of the one or other, if not of both: of which I ſhall onely give two inſtances. *Hiſt.* 3.

Sir *Bevis Bulmer* (before named) having brought the Mine at *Brunghill Moor* to great perfection, and getting great ſtore of Silver Ore (as many men yet living can teſtifie) a controverſie roſe about the ſaid Mine with Sir *Gilbert Houghton*, or his father, about the title; that grew to that height that Sir *Bevis Bulmer* was forced to give over purſuing the labour, and ſo cauſed the Workmen to throw in the Works; which have been often ſince attempted and wrought in, but the ſame rich Vein could never ſince be found.

Hiſt. 4. Another is, that Sir *Richard Houghton*, had ſet up a very profitable Mine of Allom, near unto *Houghton Tower* in the Hundred of *Blackburn*, within theſe very few years, where great ſtore of very good Allom was made and ſold; but whether ſome perſons that had Works of the ſame nature in other places, found that the ſtore gotten there, would bring down the price of that commodity; as it had all about near unto thoſe parts; or for what other cauſe I know not, a contention was raiſed againſt him about the ſame Mine, ſo that he was either compounded with, or otherwiſe forced to give it over; ſo that it is now quite left, to the loſs of the Nation in general, and to the damage of many a poor man in particular, that got their living by working there.

3. A third reaſon is, The common Diſeaſe or Condition of the Engliſh Nation, that are accuſtomed too much to dote upon foreign Commodities, and imported Wares; which makes them negligent in looking into, or improving their own native commodities, and ſuch things as their own Country yields. Which hath ſtirred up the vigilancy and induſtry of our neighbours, eſpecially the *Dutch*, who can make greater

ter benefit of our home-bred Commodities then we our ſelves, and therefore they have for many years laſt paſt brought up and tranſported all the Lead Ore they could poſſibly buy; and as I, and many other perſons have been credibly informed, did refine the ſame Ore, and thereby got no ſmall profit. And the Mine of Black Lead (or Kellow, as we call it here in the Northern parts) that is in *Cumberland*, and opened but once in 8 or 10 years, is commonly all bought by thoſe induſtrious people, of whom *Scaliger* ſaith, *animas in digitis habentes*, ſo exceeding active are they in all manual performances, while we *Engliſh* lie ſupine and idle.

CHAP. II.

Of thoſe Authors that have treated of Metals and Minerals.

IF the Authors that have written of the Mineral Kingdom were to be conſidered according to their number and multitude, then a man would think that this kind of Learning had already attained its height and Zenith. But if we come to ballance them by their ſubſtance and weight, we ſhall find them for the moſt part but light, and their writings to contain very much Chaff, and but a little Corn. For a great many of them have framed large Volumes of this knowledge, and the other parts of Nature, which had no other foundation to ſtand upon, but onely the notions and fanſies of their own brains; others were onely Tranſcribers of what others had written before them, but had little or no further experience, and ſo onely added to the bulk of thoſe kind of Writings, but not at all to the ſubſtance or matter. Others that experimentally knew ſomething in this occult Science; yet delivered their knowledge ſo darkly, that few were thereby inſtructed or bettered; and ſome few were painful and experienced men in theſe matters, and did as freely communicate their knowledge. And therefore amongſt ſo great a multitude and variety, that the Reader may in ſome ſort receive ſatisfaction, and know by which of them he is moſt like to profit, we ſhall propoſe ſome few (for it would be endleſs to enumerate all) and thoſe we ſhall rank into theſe three orders: 1. Speculative Authors. 2. Myſtical Writers, or Chymiſts. 3. The Authors that were experimental Obſervators.

1. By Speculative Writers I underſtand ſuch, who by their deep contemplations, notions, and working of their brains, thought they had catched Nature in a Net, and ſo kept her, that they were able to underſtand all her operations, both hid and open, and ſo framed large Volumes of the whole operation of Nature, as though they had been skilled in all things, when the leaſt individual may afford matter to ſtagger and baffle the greateſt of Philoſophers, of which we ſhall name ſome, not in the due order of the times they lived in, but as they occur to our memory.

1. We ſhall firſt begin with the Græcians, who though they were accounted the great Maſters in all kind of Learning, yet hath there flowed down to us but little ſcantlings of this kind of knowledge. For

Plato, one of the moſt knowing amongſt them; in all his Works (which are pretty large) I do meet with little concerning Metals and Minerals, except ſome little where he ſpeaketh of their generation; which we ſhall have occaſion to mention hereafter; for he was more frequent in confuting the Opinions of others, then in aſſerting his own; and rather adhered to dubitation then to poſitive affirmation.

2. As for *Ariſtotle* accounted the Prince of Learning, and one who would ſeem to be (almoſt) ignorant of nothing, yet what he hath written in this kind of Learning, is but in general; and far ſhort from giving ſatisfaction to ſearching ſpirits, concerning all the particulars of Mineral knowledge, and that which in general is handled by him concerning their generations, is not received by the moſt learned, nor will hold good with Experiment and Obſervation. And therefore I cannot but mind the Reader of that ingenious Confeſſion of *Zabarell* concerning *Ariſtotle*'s writing of Minerals; where he ſaith, *Non ſum enim in eo communi errore, ut putem neceſſe eſſe Ariſtotelem ita perfectam tradidiſſe naturalem Philoſophiam, ut nihil quod ab humano ingenio inveniri, aut cognoſci queat, prætermiſſum ab eo potuerit.* “For I “am not in that common error, that I ſhould think “that it is needful that *Ariſtotle* ſhould have deliver- “ed natural Philoſophy ſo perfect, that nothing which “can be invented, or known by the wit of man, was “prætermitted by him.

Jac. Zabar. l. 1. c. 30. p. 84.

3. *Hippocrates*, a moſt famous Phyſician, yet in all thoſe Works that have come down to our Age, there is little or no mention made of Minerals or Metals, ſo that we cannot underſtand what his knowledge

Gal. de Comp. Med. lib. 3. p. 1162.
Id. lib. De Antidot. pag. 1280.

was in theſe things. And as for *Galen*, though he were a moſt learned and laborious perſon that ſpared no pains to come to the knowledge and attainment of good Medicaments; for it ſeems that yearly forth of every Nation, he took care to have the moſt excellent Medicaments brought unto him: as alſo for the ſame cauſe that he travelled into *Syria*, *Cyprus*, and *Lemnos*, and left a learned Piece behind him, of the nature of Simple Medicines; wherein he deſcribeth the nature of many Minerals, as to their uſe in Phyſick, and did know divers that were artificially prepared; yet for any deep knowledge that he had in the generation and production of them, it is not manifeſt, ſeeing he took Quickſilver to be prepared by Art, and not produced by nature; and whether it would kill, being taken inwardly, or applied outwardly, he had not tried.

Id de Simp. Med. lib. 9. p. 1125.

4. *Dioſcorides*, an ancient and learned Greek Author, writ ſix Books, *De re Medica*. Upon which *Matthiolus* hath made a large and learned Commentary: in the fifth of which there are very good deſcriptions of Metals and Minerals, and their Vertues; by which a diligent and heedful Reader may gain much worthy knowledge, and eſpecially by thoſe clear expoſitions that the laborious Commentator hath made upon the Text. Yet it is to be noted that the Author *Dioſcorides*, had been more converſant in the Refining Shops then in the Mines, as ſpeaking but little of the generation of Metals in the bowels of the Earth.

5. I muſt by no means omit *C. Plinius Secundus*, who collected and writ a Book which he calls his *Natural Hiſtory*; a ſtupendious and laborious Piece,

where in the 33. and 34. Book, he treateth of Metals and Minerals, according to what it ſeems he had gathered from the Ancients; and declareth many notable things of them, hardly elſewhere to be found in any that preceded him; and may yield ſingular inſtruction to an heedful Reader. Yet are not the things he treateth of ſo clear, but that later Obſervations have diſcovered divers defects in them (if not errors) which our ſearch and induſtry ought rather to amend and perfect, then to cenſure and condemn.

6. As for the numerous, and almoſt innumerable rabble of the School-men, Expoſitors, Commentators, and followers of *Ariſtotle*, they have all of them (except in ſome ſmall trivial points) danced after his Pipe, and added little or nothing of new diſcovery, but reſted ſatisfied in following his tract. And for *Fuchſius*, *Braſavolus*, *Baccius*, and ſuch like, they have not much deviated from the reſt; though in their Writings there be ſome things worthy of note, and may much better the underſtandings of ſuch as be ignorant, if they take care to try before they truſt, and not to take every thing for a truth that they may find in them.

7. I cannot but rank *Hieronymus Cardanus* and *Scaliger* together; who (excepting their niceties, quibbles, and diſputes) have many things in them that may conduce to the improvement of this kind of learning: though neither of them, in my judgment, have ſhewed any great ſolidity gained by experience or obſervation. Onely I ſhall not forget *Johannes Henricus Alſtedius*, in that little Piece of his of *the Mineral Kingdom*; which, both for method and matter, may

Encyclop. Phyſ. par. 4. p. 487.

may ſerve for an Introduction to a Learner or Beginner. I cannot but here alſo remember, and commend the Book *De Metallicis*, ſet forth by *Andreas Cæſalpinus*, becauſe it is a pretty compendious Piece, comprehending moſt Metals and Minerals that were then known; and ſeems to be a good Collection of what had been formerly written in the common way, though it have little of later Obſervations in it; nor taſts not much of experience or trial.

8. The Jeſuite *Bernardus Cæſius* writ a Voluminous Piece of Minerologie, or Natural Philoſophy; wherein, though he expatiated too far to fetch in all things that might ſeem any way of kinred to that kind of knowledge; and that it was but a meer Collection and heap ſtoln from other Authors, and hardly any thing except notions; yet is there ſomething in it (eſpecially concerning the ſigns of diſcovering Mines and Ores) that may advantage ſuch a Reader, as either hath the skill, or will take the pains to ſever the Tares from the Wheat, and ſeparate the gold from the droſs. But I muſt by no means paſs in ſilence that univerſal Scribler and Rhapſodiſt, *Athanaſius Kircherus*, who after a great many huge and barren Volumes, did promiſe the World a Work, by him ſtyled *Mundus Subterraneus*, which put all the Learned into great expectations of ſome worthy and ſolid Piece of Mineral knowledge; but, alas! when it appeared, every Reader may ſoon be ſatisfied, that there is but very little in it, except the Title, that doth anſwer ſuch conceived expectations, or fulfill ſuch great promiſes. For excepting a few Queries ſent to the Emperours Officers in *Hungary* and *Germany*, and Anſwers unto them, there is neither

any ſolid, or new diſcovery of any thing material, tending to advance Mineral knowledge; but it is fully ſtuffed with Scandals and Lies againſt *Paracelſus*, *Arnoldus*, and *Lully*, whoſe Art of Tranſmutation or Maturation of Metals he laboureth to prove to be falſe; of which he knows no more then a blind man doth of Colours.

2. As for Myſtical Writers or Chymiſts, I put them in two ranks. 1. Thoſe that knew and writ of Vulgar Chymiſtry. 2. Thoſe that knew and writ of the Myſtical part of Chymiſtry.

1. And for the firſt, I ſhall onely reckon ſome few, as *Quercitanus*, *Mylius*, *Beguinus*, *Sala*, *Faber*, and ſuch like; who though they have written much in the way of preparing Minerals for Medicaments by Chymiſtry, yet have they done little to the diſcovery of the Nature and Generation of Metals: but yet ſome few things are here and there interſperſed in their Works, that may be worth the taking notice of, and may be of very conſiderable uſe to an intelligent perſon, of which, in ſome places hereafter, we may have occaſion to ſpeak.

2. As for *Libanius*, though he would ſeem very knowing, and a great Chymiſt, yet it is manifeſt to all that underſtand aright, that though he was a great Broyler in *Gebers* Kitchin, yet he never came to enter the Cloſet of *Philoſophick* Secrets: yet hath he (though a bitter and ſworn Enemy to *Paracelſus*) gathered ſome very true and profitable things from the Writings of other good Authors, which are worthy to be regarded. For it is diſcretion in every Student and Reader, to chuſe the good in any Writer, and to leave that which is bad: for there are few Authors that have not ſome mixture of both.

3. I cannot but commend to the ſtudious of Mineral knowledge, the *Naturæ ſanctuarium* of *Henricus Nollius*, who amongſt other things, hath methodically compriſed the Doctrine of Metals and Minerals; wherein there are many neat and witty things very worthy to be obſerved. I might here add to theſe a great number of the like, but theſe are ſufficient.

2. As for the Myſtical Authors that have treated of the Nature and Generation of Metals, though they have written ſo obſcurely, that the darkneſs of their Writing might deter the moſt earneſt deſirers from reading or ſtudying of them: but they muſt remember that, *Difficilia, quæ pulchra*; and that, *Dii ſua bona laboribus vendunt*; and that the kernel is not had, but by removing the husk and breaking the ſhell. And I muſt aſſure them, that they above all others have written moſt truly, and experimentally of the Nature of the Mineral Kingdom, (as perhaps we may ſhew hereafter) and whoſoever ſhall come truly to know the Nature and Generation of Metals and Minerals, will then underſtand that they have not written Lies.

1. And firſt thoſe that I ſhall commend unto the Reader of them that were more ancient, are *Mortenus Romanus*, *Arnoldus de Villa nova*, *Albertus Magnus*, and *Raymundus Lullius*; theſe, if rightly underſtood, will give thee a great light and entrance into the knowledge of Metals and Minerals. Neither are our Countrymen, *Roger Bacon*, *Thomas Norton*, and *George Ripley*, any way inferiour unto them. And to theſe may be joyned *Roſarius Philoſophorum*, and all the Authors contained in the *Muſæum Hermeticum*, to which might be added many others.

2. There are none more excellent (eſpecially in declaring the root and ſeminary power of Metals) then the learned *Bernardus Treviſanus*, who in his Book of Alchymy, and his learned Epiſtle to *Thomas de Bononia*, doth fully and clearly diſcover the hidden nature, generation, root, and properties of Metals; ſo that nothing can be wiſhed for more of an intelligent Reader; though he muſt note, *ut perſpicuus appareт, ita profundus deliteſcit.* To whom I may adjoyn the ſubtile Philoſopher *Michael Sendivogius*, who in his *Novum lumen Chymicum*, and his Book *De Sulphure*, hath candidly opened the ſecrets of the Metalline Kingdom; though as he adviſeth, he be to be underſtood, not according to the ſyllables, but ſenſe; and all things are to be interpreted according to the poſſibility of Nature. Neither is the acute and learned man *Michael Mayerus*, in the moſt of his Writings of leſs value and eſteem; having in many places unlocked thoſe ſecrets of the Mineral Kingdom, that lay cloſe covered in the Ænigma's and Parables of others but to be often read, and pondered upon with ſober heed, and careful attention.

3. The next (who above all of this ſort of Authors) I do moſt approve of and commend, is the Frier *Baſilius Valentinus*; who beſides his many Writings of Metals and Minerals, and of the rare Medicines, and ſecrets contained in them, hath written an elaborate Tract of all the particulars that any way may pertain to Minerals. A work ſo abſolutely compleat, that I know not any that may juſtly be compared unto it. And though it was written in the German Tongue, and but lately tranſlated into Engliſh; and that he altogether uſeth the terms of the Work-

men, or Miners, which renders it more difficult to be underſtood; yet he that will learn this knowledge muſt forbear no pains, but muſt labour about the Pits and Groves where Metals and Minerals are got, and converſe with the Labourers as well as with Books, for elſe their Terms and Language will not be underſtood; the want of which, hath cauſed no ſmall ſtop to the progreſs of this knowledge.

4. I come now to that much wronged, though moſt experienced perſon, *Theophraſtus Paracelſus*, who (notwithſtanding the malice of *Eraſtus* and all his followers) did really underſtand more of the nature, generation, and properties of Metals, (which we ſhall make good in the enſuing Diſcourſe) and of the Art of Medicine, then all thoſe his malignant Enemies, or many hundreds beſides: And had taken more pains, and made more dangerous peregrinations, even from his Cradle (being brought up under a learned Father, and the moſt knowing men that *Germany* in that time produced) to attain this knowledge, then any other perſon we know or read of; and doubtleſs knew and had ſeen more ſeveral Mines, then any one that his Enemies are able to name; as we ſhall have occaſion to ſhew hereafter.

5. Let us cloſe up this Claſs of Authors with that late learned, and deeply experienced perſon *Johannes Baptiſta van Helmont*; who though he left no Treatiſe (that ever came to light) that was purpoſely written upon this Subject, yet hath he enriched his Writing with much deep Mineral knowledge. So that it is to me no ſmall wonder, that ſeeing his Writings are ſo much read, and ſtudied, that now an *Helmontian* ſeems to overtop a common *Chymiſt*, *Paracelſian*,

and *Galeniſt*, that none hath taken the pains to gather up thoſe Pearly drops of Mineral learning, wherewith here and there he hath watered his polite and pithy ſheets; unleſs it be becauſe that the moſt of his Followers and Readers are drawn, with too longing a deſire, to obtain his Arcana's and great Medicines, thereby to purchaſe profit and honour, that they little regard the advancement of the Commonwealth of Mineral knowledge and learning.

3. The third ſort of Authors that were mentioned, were thoſe that I termed *Experimental Obſervators*, as the moſt of thoſe were that I ſhall now recite; for either they were ſuch as attended the Mines, or went thither to converſe with the Workmen to inform themſelves, or bore ſome Office about thoſe places, or were thoſe that either for curioſities ſake, or to enrich their knowledge, did gather together all the Minerals they could, or uſed the moſt of all theſe ways to gain underſtanding. And therefore I commend theſe above all the reſt before named, to be read and ſtudied of all Officers and men belonging to any Mineral or Metallick Works; and of all young Students and Beginners that ſeek after Mineral knowledge: becauſe theſe Authors ſpeak not altogether by Opinion, Fanſie, and Conjecture; but forth of their own experience, and the experience of thoſe that were converſant about the Mines, and getting of Ore, and purifying and refining of them; and therefore more certain to be relyed upon for Leaders and Teachers. And more, becauſe they have written what they knew, openly and plainly as the Subject would bear; and not in Parables, and Ænigmatical expreſſions.

1. The firſt I ſhall offer (and not one of the leaſt in worth) is *Georgius Agricola*, a perſon of great experience and laborïouſneſs; who being born in a Country (as *Melchior Adams* aſſerteth) that was exceeding fertile of all ſorts of Minerals, was thereby the better inabled to make a good progreſs towards the attainment of that kind of knowledge. To which he added induſtry and diligence; for coming to live in the Valley of *Joachim*, he was thereby better fitted for ſuch a purpoſe: and the forenamed Author ſaith, That what time he had to ſpare from curing the ſick, in attending his health, from his domeſtick affairs; he beſtowed all that partly in inquiring of perſons that were skillful in the Metallick Art, partly in reading the Writers, Greek and Latine, who had committed any thing to memory concerning Metals. But when he ſaw that very few things of that nature were extant, and that more were loſt, he determined to write of ſubterraneous things; that which he had read or learned of ſuch as were skillful in Metallick knowledge, or which he had ſeen in the Mines, or Work-houſes.

Melch. Adam. in vit. Agricol. p. 84.

This Author therefore had all thoſe advantages that might enable a man to be ſufficiently furniſhed to write of Mineral knowledge. As firſt, his reading of what others had left upon Record. Secondly, His learning from thoſe that were experienced in matters belonging to Foſſiles and Minerals. Thirdly, That which he had ſeen and obſerved, either in the bottom of the Pits and Mines, or in the Work-houſes or Shops where the Metals and Minerals were prepared, ſeparated, and refined; three ſuch advantages as ſeldom concur to promote the knowledge of one perſon.

2. Another that I ſhall name, is *Johannes Matheſius*, who giving his mind to this piece of Learning, and living in the Valley of *Joachim*, where were ſtore of Metals and Minerals; came thereby to be enabled to leave behind him that learned Piece, which he called *Sarepta*, which he writ in the German Tongue; it being an Expoſition of all thoſe places of holy Scripture, where any mention is made of Metallick matters. A Work of that worth, for declaring experimentally the nature, generation, increaſe and decreaſe, aſcenſion and deſcenſion, perfection and decay, and other properties of Metals, that I know few can equalize it, except *Baſilius Valentinus*.

3. A third is *Johannes Kentmannus*, who writ an excellent Treatiſe, which he ſtyled, *A Nomenclature of ſuch Foſſiles as were eſpecially found in* Miſnia, *and alſo in other Regions.* A Book that ſheweth not onely the Authors learning, but diligence and veracity; he chiefly writing of thoſe things that were to be found in his own Country: and therefore he the eaſilier might come to the certain knowledg of them. Wherein it appeareth that he was moſt painful, having gotten a Repoſitory furniſhed (beſides many things elſe) with Gold, Argent Vive, Copper, Metallick Cadmia, Plumbago, Pyrites, *Plumbum nigrum*, *Cinereum*, & *Candidum*, Antimony, Iron, and Steel, that is doubtleſly the Ore of all theſe.

Melch. Ad. in vit. Jo. Kent. p.128.

4. In the next place I ſhall name *Caſpar Schwenckfeldt*, who writ a Catalogue of the Plants and Foſſiles of his own Countrey *Sileſia*; a Work by many much commended, (for I have not ſeen the Book) and is of much affinity with the Authour foregoing. Alſo

Chriſtophorus Encelius writ a Book, *De re Metallica* ; wherein there is much of truth ſhewn, and ſeems to have proceeded from a candid mind, and was in part the product of his own experience. A Piece for its method and brevity, very fit for a Freſh-man in theſe ſtudies. *Andreas Soleas* may well alſo be remembred, who is exceedingly commended by *Mayerus* ; but I ſhall ſay the leſs of it, becauſe I have not had the happineſs to peruſe it. But *Sebaſtianus Munſter* in his Book of Geography, hath many things concerning Metals, which are very well worth reading, and a ſerious conſideration. I ſhould have inſerted *Gabriel Fallopius* with thoſe of the firſt rank, but had forgot him ; yet muſt now commend him to the ſtudious, as one that hath toyled ſore by Arguments to promote Mineral knowledge.

5. I had almoſt forgot that famous Chymical Phyſician *Martinus Rulandus*; who, beſides his excellency in the Medical Profeſſion, and his good fortune in curing diſeaſes, being a Maſter of many rare Arcana's ; hath alſo taken no ſmall pains to enrich his mind with the knowledge of Minerals and Metals : as his moſt learned Book, called by him *Lexicon Alchymiæ*, may witneſs. Wherein, beſides his great reading in all foregoing Authors that had written of that Subject, he hath manifeſted extraordinary pains in getting the knowledge of moſt (if not all) the ſeveral Ores of Metals and Minerals, that were contained within the large Territories of the German Continent, and the names of the places where they were gotten. A Work truly worthy of eternal commendations, and of that ſingular uſe, that no perſon ſtudious of Mineral knowledge, can well be expert, without the peruſal and underſtanding thereof.

6. Laſtly, I ſhall commend unto all diligent inquirers into the knowledge of Metals and Minerals, the Writings of that learned Chymiſt and great Traveller *Johannes Agricola*, his two Volumes upon *Humerus Poppius* Book of Antimony; wherein is contained many rare obſervations about the generation of Metals, that are hardly elſewhere to be found or read. As alſo thoſe curious pieces concerning Chymical preparations, and the nature and properties of Minerals, written by *Johannes Pharamundus Rhumelius*: wherein is contained the deſcription of the *primum ens auri*, and of ſome other rare Minerals that ſcarcely any other Author hath named, or made mention of. And though both theſe Authors were written in the High-Dutch Language, and not yet (that I can underſtand) tranſlated, yet I thought good to mention them, becauſe it may ſtir up ſome others (of more abilities then my ſelf) to procure and peruſe them, and perhaps of rendring them into our *Engliſh* or the *Latine* Tongue.

To theſe may be added that Elaborate Piece of *Olaus Wormius* which he calls his *Muſæum*; wherein is not onely contained many rare Ores of Metals and Minerals, but a ſuccinct Hiſtory of all that belongs to the Subterranean Kingdom.

CHAP. III.

Of the generation of Metals, and whether they grow, and have Vegetability, or not.

IT is the general Opinion, not onely of the Vulgar, but alſo of moſt of the Mine-men that I have converſed withal, (which have been no ſmall number) that Metals do not grow in the Earth, but were all at once created of God; and ſo have no ſeminary principle to propagate themſelves by. Which fooliſh Conceit the moſt part of learned men have rejected; nay, even the *Collegium Conimbricenſe* it ſelf, and therefore it is needleſs to waſte time in the confutation thereof.

Now though the whole ſtream of Myſtical Authors, or Adeptiſts, have aſſerted the generation and growth of them; yet have they rather left it as a Principle to be granted, and believed of their Diſciples, or handled it ſo darkly, that few have been able thorowly to underſtand it. And therefore (as a point moſt material and neceſſary) we ſhall labour as much as in us lies, to make it clear, both by reaſons, and obſervations from credible Authors.

Reaſ. 1.

L. of Nat. Bath. &c. c. 11. p. 51.

Our learned and ingenious Countryman Doctor *Jorden*, giveth this Reaſon for the generation of Metal: and ſaith, “It appears in *Geneſis*, that Plants “were not created perfect at firſt, but only in their ſe“minaries: for *Moſes*, *Chap.* 2. gives a reaſon why Plants “were not come forth of the Earth; *ſcil.* becauſe (as “*Tremellius* tranſlates it) there had as yet neither any

“rain fallen, nor any dew aſcended from the earth;
“whereby they might be produced and nouriſhed.
“The like we may judge of Minerals, that they were
“not at firſt created perfect, but diſpoſed of in ſuch
“ſort, as they ſhould perpetuate themſelves in their
“ſeveral kinds. And to this ſame purpoſe the pro-
“found *Sendivoglus* ſaith, *Et quam prerogativam ve-*
“*getabilia præ metallis habent, ut Deus illis ſemen inde-*
“*ret, & hæc immerito excluderet? nonne ejuſdem digni-*
“*tatis metalla apud Deum cujus & arbores? Hoc pro*
“*certo ſtatuatur, nihil ſine ſemine creſcere, ubi enim*
“*nullum eſt ſemen, res eſt mortua.* And what pre-
“rogative have Vegetables above Metals, that God
“ſhould put ſeed into them, and undeſervedly exclude
“theſe? Are not Metals of the ſame dignity with
“God that Trees are? This may be ſet down for cer-
“tain, that nothing doth increaſe without ſeed; for
“where there is no ſeed, that thing is dead.

No. lum. Chym. tract. 6. p. 3:0.

A ſecond reaſon is alſo given by the laſt named
Author; who ſaith, “*Neceſſe eſt ergo, ut vel qua-*
“*tuor elementa creent ſemen metallorum, vel ea pro-*
“*ducant ſine ſemine: ſi abſque ſemine producuntur,*
“*tunc perfecta fieri non poſſunt, ſiquidem res omnis ſi-*
“*ne ſemine imperfecta eſt, ratione compoſiti.* There-
“fore it is of neceſſity, that either the four Elements
“ſhould create the ſeed of Metals, or that they ſhould
“produce them without ſeed. If they be produced
“without ſeed, then they cannot be made perfect;
“ſeeing every thing is imperfect without ſeed, in
“regard of the Compound.

Reaſ. 2.

Ut ſupr.

A third reaſon I take to be this, To prove that Metals
are generated: That whoſoever hath diligently con-
ſidered the manner how moſt Metals do lie in their

Reaſ. 3.

wombs, or beds, which for the moſt part are hard Rocks, Cliffs, and Stones, or things equivalently as hard as they, as lank and ſpare, muſt neceſſarily conclude, that they could never have penetrated the Clefts, Chinks, and porous places of ſuch hard bodies, but that before their entrance into thoſe cavities, they were in *principiis ſolutis*, either in form of water, or vapours, and ſteams. And then were thoſe ſteams, or that water produced before their induration into a Metalline form, and after concocted and maturated into ſeveral forms of Metals; which is an analogous, if not an univocal generation; otherwiſe they could never be found in ſuch ſtreight paſſages, and narrow cavities, as all experience doth teſtifie they are.

Reaſ. 4. The laſt reaſon, though ſome may account it light, yet I hold it (and ſo will all perſons that underſtand the Philoſophers grand Secret) to be very cogent; and that is, that either the maxims of the great Maſters of abſtruſe Philoſophy, is falſe; as that Natures ultimate labour is in time to bring all Metals to the perfection of Gold: which ſhe would accompliſh, if they were not unripe and untimely taken forth of the bowels of the Earth; or elſe it is falſe that Metals do not grow, and have vegetability. For thoſe unripe ones, as Quickſilver, Lead, Tin, and others, have been by the ocular teſtimony of *Helmont*, who confeſſeth that he had divers times had the Gold-making powder in his hands, and of other Authors of unqueſtionable veracity, and ſome others yet living, have been maturated into Gold; which muſt of neceſſity be falſe, if Metals, by reaſon of their Analytical Homogeneity, which in all is Mercurial, had not an intrinſecal power of vegetability; for then Art (which is nothing but by its help, an acceleration of the work of Nature; and performing of that in a ſhort time, which Nature only, without the help of Art, could but accompliſh in many years) could never bring to paſs. For though that the producing of Glaſs forth of Sand and Aſhes, be done by Art, and the force of the fire, and ſo is as it were the product of Art, and in a manner a new creature; yet if Nature intrinſecally had not contained it in its power, Art could not have produced that effect. So that it is clear, that either Metals have an analogous kind of vegetability in them, or elſe the Art of tranſmutation of Metals is falſe, and all the grounds of the more abſtruſe Philoſophy, without verity.

Obſerv. 1. Of Nat. Bath. &c. c. 11. p. 51, 52.

Now we ſhall prove by the obſervations of Authors of credible veracity, that Metals have growth and vegetability. And firſt we ſhall begin with our Countryman Doctor *Jorden*, who ſaith thus, “ Our
“ Salt-petre men find, that when they have extracted
“ Salt-petre out of a floor of earth one year, within
“ three or four years after, they find more Salt-petre
“ generated there, and do work it over again. The like
“ is obſerved in Allom and Copperas.

“ And for Metals, our Tinners in *Cornwall* have experience
“ of Pits which have been filled up with
“ Earth, after they have wrought out all the Tin they
“ could find in them, and within thirty years they have
“ opened them again, and found more Tin generated.
“ The like hath been obſerved in Iron, as *Gaudentius*
“ *Merula* reports of *Ilna*, an Iſland in the *Adriatick*
“ Sea, under the *Venetians*, where Iron breeds continually,
“ as faſt as they can work it; which is confirmed
“ alſo by *Agricola* and *Baccius*. The like we read

In Sarept. Conci. 3. 11, &c.
n Alchym. magn. De Metallis p. 17. & 19.

“read of at *Saga* in *Lyglis*, where they dig over their Iron mines every tenth year. And of *Ilna* it is remembred by *Virgil*, who ſaith, *Ilnaque inexhauſtis Chalybum generoſa metallis. John Matheſius* gives us examples almoſt of all ſorts of Minerals and Metals, which he had obſerved to grow and regenerate. The like examples you may find in *Leonardus Thurniſſerus*; *Eraſtus* affirms that he did ſee in *S. Joachims* dale, ſilver grown upon a beam of Wood which was placed in the Pit to ſupport the Works; and when it was rotten, the Workmen coming to ſet new timber in the place, found the ſilver ſticking to the old beam. Alſo he reports that in *Germany* there hath been unripe and unconcocted ſilver found in Mines; which the beſt Workmen affirmed would become perfect ſilver in thirty years. The like *Modeſtinus*, *Facchius*, and *Matheſius*, affirm of unripe and liquid ſilver; which when the Workmen find, they uſe to ſay, *We are come too ſoon.*

And in the ſame place before quoted, I find *Eraſtus* to have this relation. “I have (he ſaith) two ſtones of Iron, one of an Ironiſh colour, the other of the colour of the ſhell of a ripe Cheſnut; altogether ſoft and fatty, that they may like butter be wrought with the finger; from which notwithſtanding, hard and good Iron was extracted by the fire.

Obſerv. 2. And to confirm this that Dr. *Jorden* hath ſaid, we know certainly that in many places of this Nation where perſons make a kind of a trade to draw forth Salt-petre, they keep Earth (fit for that purpoſe) in Cellars, where once in three or four years (though formerly all the Salt-petre hath been extracted) it will renew it ſelf, and be fully impregnated with more

Salt, as is moſt likely, from the Atoms of Salt diſperſed in the air, or *æther*, which ſome hold to be nothing elſe but pure volatiz'd Salt.

It is alſo common in the Northern parts of *England* to dig up certain ſorts of bituminous earth to burn; which is much of their firing where there is want of Wood and Coals, and they commonly call them *Peats*, being digged two or three yards, and ſometimes leſs or more deep, forth of the ground; which places they call *Peat-pits* and *Moſſes*, of which they have divers. And when they have digged ſome, that there is no more of that ſort of bituminous Earth left, they uſually leave one depth of a Spade-graft of that Earth, and ſo cover them with the ſoil, or firſt graſſie Earth that they cut up, and ſo leave them for certain time, as twenty or thirty years, and they will be filled, and grow up with the ſame ſort of Earth again. And though it may be ſaid, that the being filled up again is no great matter, becauſe the wind blows duſt, and the rain doth bring down mud and ſand from the higher places, by which again they are ſoon filled. Yet this will not ſolve the buſineſs, for what ſhould turn the duſt, mud, and ſand into that kind of bituminous Earth, that when they dig there again, they find them as good as before, and as fit for burning; ſo that doubtleſs that kind of Earth doth grow, and is generated. And it is as plain that ſtones do grow and increaſe, and though they may alledge, that it is but by *juxtapoſition* (as *Fallopius* feigned the term) if they mean by aggregation and appoſition of Atoms, or ſmall corpuſcular particles we ſhall concede; for ſo we imagine the moſt of thoſe we call generations (which indeed are but accretions and augmentation of

Gabr. Fallop. de re Metal. c.6.p.276.

ſmall and minute bodies, already framed in their ſeveral ſeminaries, matrixes, or ſeed-husks) to be brought to perfection. But if they mean meerly by appoſition of more to that which was already gathered, onely an increaſe in the bulk, and nothing elſe, then it is falſe; for in Vegetables there is a ſeminal ſpirit, vapour, or ſteam, that doth tranſmute, and aſſimilate the juice of every Plant into this or that individual, as of a Pear into that kind of Plant, a Roſe into that kind, and ſo of the like: and in ſtones there is a petrifying quality, vapour or ſteam, that doth turn the matter aggregated, into the nature of this or that ſtone; as in flint, to flint; in greet, or free-ſtone, to the like. And that the generation of all ſorts of thoſe ſtones we call ſand-ſtones, is ſuch, by ſome liquor, vapor, or ordor, coagulating, (or as *Avicen* learnedly ſpeaketh) conglutinating the ſmall ſandy particles together, is manifeſt in thoſe ſoft red greet-ſtones that they build their houſes with, at and near *Cheſter*; for the ſand there is of the ſame colour and nature: and the ſtones may even with ones hands be crumbled to ſand and powder; and often with the ſaid greets may be obſerved great numbers of ſmall pebbles (ſilices) far more hard, and of another nature in the coagulation, cemented and incloſed in them. Which may be alſo noted in our free-ſtone (which is of a far harder nature, and ſmoother grain) in the moſt of the North parts of *England*. So that if Earth renew it ſelf with Salt regenerated; and that bituminous Earths have their increaſe, and ſtones their growth and augmentation, we may well believe that other Minerals and Metals have the like; and from hence *Sendivogius* doth draw this concluſion: *Inde*

Avic. de congel. & congl. lapid. in l. Art. Aur p.240.

fit

ſit quod hodie reperiantur mineræ in locis, ubi ante mille annos nullæ fuerunt. From hence it come to paſs that Minerals may be found in places, where before a thouſand years ſince, there have none been.

Nov. Lum. Chym. Tract. 4.p.314.

And that Metals do grow even like other Vegetables, is manifeſt from divers examples. For the honourable Mr. *Boyle* from the teſtimony of *Gerhardus* the Phyſick Profeſſor, telleth us in theſe words; *In valle Joachimaca* (ſays he) *argentum graminis modo & more è lapidibus mineræ velut è radice excreviſſe digiti longitudine, teſtis eſt D. Schreterus, qui ejuſmodi veras aſpectu jucundas & admirabiles domi ſuæ aliis ſæpe monſtravit & donavit.* In the vale of *Joachim*, Dr. *Schreter* is a witneſs, that ſilver in the manner and faſhion of graſs, had grown out of the ſtones of the Mine, as from a root, in the length of a finger; who hath ſhewed theſe Veins very pleaſant to behold, and admirable at his own houſe, and given of them to others.

Obſerv. 3.

Scept. Chym. p.360.

And *Rulandus* telling of ſilver that is found pure, *quod ſtatim ſuum eſt*, as is their proper diſtinction of it from other ſorts, ſaith; *Sed hoc argentum purum tenuiſſimis bracteis amplectitur lapidem. Interdum etiam præ ſe fert ſpeciem capillorum, interdum virgularum, interdum globi fert ſpeciem, quaſi filis convoluti candidis aut rubris: interdum præ ſe fert ſpeciem arboris, inſtrumenti, montium, herbarum, & aliarum rerum.* And this pure ſilver doth imbrace the ſtone with moſt tender leaves, plates, or ſpangles. It ſometimes alſo beareth the ſhape of hairs, ſometimes of little twigs, ſometimes it beareth the ſhape of a globe or round ball, as though wrapped about with threds white, or red. Sometimes it beareth the ſhape of a Tree,

Lex. Alchym. p.56.

Tree, mountains, an inſtrument, herbs, and of other things.

Decad.3.c.8. p.139. To theſe add that moſt remarkable paſſage of *Peter Martyr*, Counſellor to the Emperour *Charles* the fifth, who relateth thus: "They have found by experience "that the Vein of gold is a living Tree, and that the "ſame by all ways ſpreadeth and ſpringeth from the "root, by the ſoft pores and paſſages of the Earth, "putteth forth branches, even to the uppermoſt part "of the Earth; and ceaſeth not until it diſcover it "ſelf unto the open air: at which time it ſheweth "forth certain beautiful colours in the ſtead of flowers, "round ſtones of golden Earth in the ſtead of fruits, "and thin plates in ſtead of leaves. Theſe are they "which are diſperſed throughout the whole Iſland (he "is ſpeaking of *Hiſpaniola*) by the courſe of the Ri"vers, eruptions of the Springs out of the Mountains, "and violent falls of the flouds. For they think ſuch "grains are not engendered where they are gathered, "eſpecially on the dry land, but otherwiſe in the Ri"vers. They ſay that the root of the golden Tree ex"tendeth to the center of the Earth, and there taketh "nouriſhment of increaſe: for the deeper that they "dig, they find the trunks thereof to be ſo much the "greater, as far as they may follow it, for abundance "of water ſpringing in the Mountains. Of the bran"ches of this Tree, they find ſome as ſmall as a thred, "and other as big as a mans finger, according to the "largeneſs or ſtreightneſs of the rifts and clefts. They "have ſometimes chanced upon whole Caves, ſuſtain"ed and born up as it were with golden pillars, and this "in the ways by which the branches aſcend: the "which being filled with the ſubſtance of the trunk "creeping from beneath the branch, maketh it-ſelf "way by which it may paſs out. It is oftentimes "divided by encountring with ſome kind of hard "ſtone; yet is it in other Clifts nouriſhed by the ex- "halations, and virtue of the root.

Now theſe ſignal obſervations ſeem fully to evince, that it is no feigned fable of the Myſtical Philoſophers, nor (however Ignorants may ſcoff and ſnarl) of that profound and learned Poet *Virgil*, that there is a gold-bearing and metallick Tree, as he famouſly hath ſung,

Æneid.l.6.p. 345.

——Latet arbore opaca
Aureus & foliis, & lento vimine ramus.

And after,

——Primo avulſo non deficit alter
Aureus, & ſimili frondeſcit virga Metallo.

Jo. Aur. Augurel.Chryſop. l.2. p.36.

The deep and ſerious conſideration of which, as alſo that learned deſcription that the profound Chymiſt *Augurellus* gives of that noble Mineral or metallick Tree, called by him *Glaura*, ſo well known unto, and whoſe ſulphur above the ſulphurs of all other Minerals, is ſo much extolled by the experienced *Helmont*; I faithfully commend unto all the cordial lovers of Mineral knowledge, to ſeek for, and inquire after. And ſhall ſhut up theſe teſtimonies with that golden ſentence of the golden Tree, mentioned by *Paracelſus*; where ſpeaking of the ſulphur of gold, he ſaith, *Hoc ſulphur, ſi quale in aurifera arbore, & ad hujus radicem in montibus eſt, Alchymiſtæ invenire & adipiſci poſſent, eſſet certe, de quo effuſe gauderent.* This ſulphur, if the Alchymiſts could find out and attain, as it

Par. l. de Min. Tr. 1. p.347.

is in the gold bearing Tree and at the root of it, in the Mountains, it would certainly be a thing of which they might fully rejoyce.

Obſerv. 4. Further (beſides what to the ſame purpoſe hath been ſhewed above) it will appear that Metals may be (and have often been) found in a ſoft and liquid form or ſubſtance; as the forementioned honourable and worthy perſon Mr. *Boyle* hath inſtanced from *Gerhardus*, in theſe words: *Item aqua cærulea inventa eſt Annebergæ, ubi argentum adhuc erat in primo ente, quæ coagulata, redacta in calcem fixi & boni argenti.* Alſo that at *Anneberg* a blew water was found, where ſilver was yet in its firſt being or ens, which coagulated, was reduced into the powder or calx of fixed and good ſilver. Scept. Chym. p 360.

Theatr. Chym. Arcæ Arcan. p 318. The Author *Arcæ Arcan.* from *Lully* and *Matheſius* tells us this: “*Materiam, priuſquam in metallicam formam congelatur, eſſe inſtar lactis coaguli butyri, quæ in butyrum diducitur, quam* Gur *vocat, quam ego quoque in fodinis in quibus natura plumbum paravit inveni.* That the matter (*viz.* of Metals) before it be coagulated into a metallick form, is like unto Butter made of the Cream of milk, which may be clamed or ſpread as Butter, which he (he meaneth *Matheſius*) calleth *Gur*; which I alſo (ſaith the Author quoted) have found in the Mines, where Nature hath produced Lead.

Hiſt. 1. To ratifie this, and to put it forth of doubt, I ſhall relate what I my ſelf have found, and now have ſome pounds of it by me. Inquiring after this *Gur* of all perſons that I could hear of that wrought in Mines, there could ſome of them tell me, that often in the ſudden breaking of ſome ſtone, there would a liquor ſpurt forth bright and ſhining, which they regarded not, becauſe they knew no uſe nor benefit to be made of it, nor knew how to ſave or keep it. At laſt, meeting with an ingenious young man, whoſe Father had all his days been experienced in working in the Mines of Lead in *Darbyſhire,* and he therein alſo had been trained up from his young years: one whom I had formerly much imployed in ſeeking and procuring for me, ſeveral ſorts of Oars, Minerals, Stones, and Earths, wherein I had found him very faithful and diligent; and diſcourſing with him about what liquid juyces or waters he had ever obſerved in digging in the Mines, and inſtructing him in all that I underſtood of ſuch things, according as I had read in *Paracelſus, Helmont,* or other Writers, he thought the thing might be feaſible. So according to my directions, providing himſelf of ſome woodden diſhes to take with him, it was not very long ere he brought me a large quantity, found in a trench; where then he got good ſtore of Lead Ore, ſuch as the Miners account the beſt for their purpoſe; that is, ſuch as will moſt eaſily run, or melt, and yield the moſt Lead: the deſcription of which I ſhall here give as fully as I am able. It was (as he moſt faithfully affirmed) when he firſt broke the hard ſtone in which it was incloſed, ſome of it eſpecially very thin and liquid, ſo as he could hardly preſerve it;and the other as ſoft as Butter,and the inmoſt part of that he brought was as ſoft as Butter, to my touch and feeling, and the outſide more hard; for the longer it lay to the air, the harder it grew. It was of a greyiſh or whitiſh colour, and would ſpread with ones finger upon a table, or ſmooth piece of wood, as like Butter as could be, but not ſo fatty, or greaſie: and as *Hel-*

mont ſaith, was like unto ſoft ſoap, but moſt of it ſomething harder, for he had brought it near two miles to me, and though he had made haſte, yet it had hardened by the air in the way. He alſo brought divers of the pieces of the hard grey ſtone, in whoſe holes and cavities it lay, and ſome of it in the midſt, little pieces of Lead, bright and pure Ore. So that if a man may give any reaſonable conjecture, one would verily imagine that the piece of Lead incloſed in this ſoft matter, did in continuance of time change, or ripen it into its own Nature; which I will not poſitively affirm, but commend it to further trial and inquiry, for there had need be many careful experiments, before an Opinion be raiſed from them. But I remember that the Colliers and thoſe that ſeek for Coal-mines, do uſually before they find the Mine of Coals, find in their boring or other working, ſuch matter as they call Crow-ſtone, Coal-ſtone, and Soap-ſtone; the laſt of which is a black ſubſtance like fat Clay, and will (as the *Gur*) ſpread like Butter, but will ſoon harden in the air, into an hard matter that will hardly be cut with a knife, and ſomewhat harder then the other will do, which I take to be true *Gur*; and this as a common thing I do but onely name, to illuſtrate the other by: which both makes me more and more admire the skill and knowledge of *Paracelſus* and *Helmont*, and to wonder at our ignorance in theſe things.

An obſervation agreeable to this (as I conceive) that I have related of mine own experience, is that of *Helmont*, which he gives us thus. “ *Non raro nempe* “ *contingit, quod metallarius in fodinis, ſaxa diffrin-* “ *gens, dehiſcat paries & rimam det, unde tantillum*

“ *aquæ ſubalbidæ vireſcentis manavit, quod mox concrevit inſtar ſaponis liquidi* (Bur *voco*) *mutatoque* Insg. oport. p.157. “ *deinceps pallore ſubviridi, flaveſcit, vel albeſcit,* “ *vel ſaturatius virideſcit.* For it often happeneth “ that a Mine-man in the Pits breaking ſtones, the “ wall is opened and ſhews a chink from whence a “ water hath flowed of a ſomewhat whitiſh greeneſs; “ which by and by hath thickned, like ſoft Soap (I call “ it *Bur*) and forthwith the ſomewhat greeniſh paleneſs being changed, it groweth yellowiſh, or whitiſh, or more fully greeniſh. This I would have the Reader to conſider ſeriouſly of, in comparing it with the former relation; and to note, that whereas he calls it *Bur*, I ſuſpect the Print is falſe, and that it ought to be read *Gur*.

Now we ſhall come to what *Paracelſus* hath left written in relation to this very particular, wherein I muſt needs ſay, that in deſpite of all gainſayers, or ignorant haters of him, it will appear to all judicious perſons, that he truely knew more then the moſt of all thoſe that went before him; and firſt ſpecial notice may well be taken of that remarkable paſſage, where he ſaith; “ *Sciendum eſt, metallum quodvis,* Rer.Natur. l.9. p.113. “ *quamdiu in primo ente adhuc latet conditum, peculiaria ſua aſtra habere. Quamprimum autem ad ſuam* “ *perfectionem venerunt, & in fixum metallicum* “ *corpus coagulantur, ab illorum quolibet ſua aſtra recedunt, & corpus ſuum relinquunt mortuum.* It is “ to be known that every Metal, whiles yet it lyeth “ hid in its firſt being, or *ens*, hath its peculiar “ ſtars. But as ſoon as they come unto their perfection, and are coagulated into a fixt metallick body, “ their ſtars do go back from each of them, and leave

“their

Vid. Parac. l. de Rev. & Reſtaur. p. 43, 44, 45. & Chir. mag. p. 243, 244, & 117.

“their body dead. He likewiſe in other places (that I ſhall not recite at large, becauſe I ſhall have occaſion to do it more fully in another place) doth make mention of the firſt being, or the *primum ens auri*, in form of a red water, and to be had before it be coagulated into an hard metallick body; as alſo of Antimony and of Quickſilver; to which I refer the Reader, for brevity ſake.

Obſerv. 5.

Scept. Chym. p. 357, 358.

We ſhall now go to prove the growth of Metals from a fuller teſtimony of that honourable and learned perſon Mr. *Boyle*, who ſaith: “And as for Metals themſelves, Authors of good note aſſure us, that even they were not in the beginning produced at once altogether, but have been obſerved to grow; ſo that what was not a Mineral or Metal before, became one afterwards: of this it were eaſie to alledge many teſtimonies of profeſſed Chymiſts. But that they may have the greater authority, I ſhall rather preſent you with a few borrowed from more unſuſpected Writers. *Sulphuris mineram* (as the inquiſitive *P. Fallopius* notes) *quæ nutrix eſt caloris ſubterranei ſabri ſeu Archæi fontium & mineralium, infra terram citiſſime renaſci teſtantur Hiſtoriæ metallicæ. Sunt enim loca è quibus ſi hoc anno ſulphur effoſſum fuerit, intermiſſa foſſione per quadriennium, redeunt foſſores, & omnia ſulphure, ut antea, rurſus inveniunt plena. Pliny* relates, *In Italiæ inſula Ilna, gigni ferri metallum. Strabo multo expreſſius; effoſſum ibi metallum ſemper regenerari. Nam ſi effoſſio ſpatio centum annorum intermittebatur, & iterum illuc revertebantur, foſſores reperiſſe maximam copiam ferri regeneratum.* Which Hiſtory not only is countenanced by *Fallopius*, from the Income

“which the Iron of that Iſland yielded the Duke of
“*Florence* in his time; but is mentioned more expreſly
“to our purpoſe, by the learned *Ceſalpinus. Vena*
“(ſays he) *ferri copioſiſſima eſt in Italia, ob eam nobilitata*
“*Ilna Tyrrheni maris inſula incredibili copia,*
“*etiam noſtris temporibus eam gignens. Nam terra*
“*quæ eruitur dum vena effoditur tota, procedente tempore*
“*in venam convertitur.* Which laſt clauſe is
“therefore very notable, becauſe from thence we may
“deduce, that Earth by a metalline plaſtick principle
“latent in it, may be in proceſs of time changed into
“a Metal. And even *Agricola* himſelf, though the
“Chymiſts complain of him as their adverſary, acknowledgeth
“thus much and more; by telling us
“that at a Town called *Saga* in *Germany*, they dig up
“Iron in the fields by ſinking Ditches two foot deep;
“and adding that within the ſpace of ten years the
“Ditches are digged again for Iron ſince produced.
“As the ſame Metal is wont to be obtained in *Ilna*.
“Alſo concerning Lead, not to mention what even
“*Galen* notes, that it will increaſe both in bulk
“and weight, if it be long kept in Vaults or Cellars,
“where the air is groſs and thick, as he collects from
“the ſwelling of thoſe pieces that were imployed to
“faſten together the parts of old Statues. Not to mention
“this, I ſay *Boccacius Certaldus*, as I find him
“quoted by a diligent Writer, hath this paſſage
“touching the growth of Lead. *Feſularum mons*
“(ſays he) *in Hetruria Florentiæ civitati imminens,*
“*lapides plumbarios habet; qui ſi excidantur, brevi*
“*temporis ſpatio, novis incrementis inſtaurantur, ut*
“(annexes my Author) *tradit Boccacius Certaldus,*
“*qui id compotiſſimum eſſe ſcribit. Nihil hoc novi eſt;*

“ *ſed de eadem Plinius, lib.* 34. *Hiſt. Natur. cap.* 17.
“ *dudum prodidit, inquiens, mirum in his ſolis plumbi*
“ *metallis, quod derelicta fertilius reviviſcunt. In*
“ *plumbariis ſecundo lapide ab Amberga dictis ad Aſy-*
“ *lum recrementa congeſta in cumulos, expoſita ſolibus*
“ *pluviiſque paucis annis, reddunt ſuum metallum cum*
“ *fænore.*

Obſerv. 6. The laſt thing that I ſhall obſerve to prove the generation of Metals, ſhall be from the quotations of Liban. Alchym. Tranſmut. def. p. 207. *Libanius*, which I do not ſo much for the credit that I give unto him, as to the Authors that he citeth; of which I ſhall cull forth ſome, and give their meaning in *Engliſh*, that I may not be too tedious. The ſame (of which he had ſpoken before) he ſaith *Maiolius* doth record, *colloq.* 19. *Tom.* 1. *Canicul.* and is confirmed in the hiſtory of *Pannonia*. In *Pannonia*, near the City *Firmicum*, hard by the Vines, in the Spring, golden Sprigs do ſhoot forth themſelves, and of them for that cauſe money is much coined there. Alſo *Fulgoſus* (he ſaith) doth bring ocular witneſſes, *lib.* 1. *Fabricius ex* 4. *Genealium dierum Alexandri Neapolitani.*

The ſame *Alexander* hath found by certain and faith-worthy Authors in the nearer *Germany* between *Danubius*, that there are Vines, which do ſprout forth little branches, and for the moſt part whitiſh leaves, of pure gold, which are given to Kings and chief Commanders for a rare gift, *&c.* Further, He ſaith that *Kentman* doth deliver, that of the recrements of Iron, divided into heaps, or banks made of them that are ancient, that a new Iron is excocted forth of them, *Agric. lib.* 5. *de ortu ſubterraneorum, cap.* 1. That Metals are generated, Iron is an inſtance, that in the Metals of *Ilna*, the moſt approved Writers have committed to memory, that it doth grow again. For that to the ſame Lead ſet in a moiſt place there is increaſe, of which thing *Galen* is witneſs. Certainly thoſe Lead coverings, with which we ſee the roofs of the houſes of Noble men to be overlaid, they find to be much more heaviy after certain years, then before, when they had tried their weight; and ſo far forth that they are very often forced to change them for brazen ones. *Matheſius Concion.* 3. *Sareptana proponit & deducit tria.* 1. That Metals even in his time, and then, did increaſe in the Veins and Mines. 2. That one Mineral in time, did change into another that was better. 3. That a perfect Metal, unleſs it be digged up, is conſumed of the ſubterraneous fumes and heat.

Obſerv. 7.

Scept. Chym. p. 361, 362, 363.

There is another remarkable obſervation quoted by the forementioned Mr. *Boyle*, which I ſhall give you in his own words, which are theſe: ‘The other ‘two relations I have not met with in Latine Authors, ‘and yet they are both very memorable in themſelves, ‘and as pertinent to our purpoſe. The firſt I meet ‘with in the Commentary of *Johannes Valehius* upon ‘the *Klein Baur*, in which that induſtrious Chymiſt ‘relates with many circumſtances, that at a Mine-town ‘(if I may ſo Engliſh the German Bergſtadt) eight ‘miles or leagues diſtant from *Strasburg*, called *Maria Kirk*, a Workman came to the Overſeer and ‘deſired imployment; but he telling him that there ‘was not any of the beſt ſort at preſent for him, added ‘that till he could be preferred to ſome ſuch, he might ‘in the mean time, to avoid idleneſs, work in a Grove ‘or Mine-pit thereabouts, which at that time was little eſteemed. This Workman after ſome weeks la-

'bour, had by a crack appearing in the ſtone upon a 'ſtroke given near the wall, an invitation given him 'to work his way through; which as ſoon as he had 'done, his eyes were ſaluted by a mighty ſtone or 'lump, which ſtood in the middle of the Cleft (that 'had a hollow place behind it) upright, and in ſhew 'like an armed man; but conſiſted of pure fine ſilver 'having no Vein or Ore by it, or any other additament; but ſtood there free, having onely underfoot 'ſomething like a burnt matter: and yet this one 'lump held in weight above 1000 marks, which according to the Dutch account makes 500 pound 'weight of fine ſilver. From which and other circumſtances my Author gathers, that by the warmth 'of the place, the noble metalline ſpirits (ſulphureous 'and mercurial) were carried from the neighbouring 'Galleries or Vaults, through other ſmaller cracks and 'Clefts, into that cavity, and there collected as in a 'cloſe Chamber or Cellar, whereinto when they 'were gotten, they did in proceſs of time ſettle into 'the forementioned pretious maſs of Metal.

'The other German relation is of that great Traveller, and laborious Chymiſt, *Johannes* (not *Georgius*) *Agricola*; who in his Notes upon what *Poppius* hath written of Antimony, relates, that when he 'was among the *Hungarian* Mines in the deep Groves, 'he obſerved that there would often ariſe in them a 'warm ſteam (not of that malignant ſort which the '*Germans* call *Shwadt*, which (ſays he) is a meer poyſon, and often ſuffocates the Diggers) which faſtned 'it ſelf to the walls; and that coming again to review 'it after a couple of days, he diſcerned that it was all 'very faſt and gliſtering. Whereupon having col-

'lected it and diſtilled it *per Retortam*, he obtained 'from it a fine ſpirit; adding that the Mine-men in'form'd him that this ſteam or damp of the Mine (re'taining the Dutch term) would at laſt have become 'a Metal, as Gold or Silver. And afterwards he ad'deth, I remember that a very skillful and credible 'perſon affirmed to me, that being in the *Hungarian* 'Mines he had the good fortune to ſee a Mineral that 'was there digged up; wherein pieces of Gold of the 'length, and alſo almoſt of the bigneſs of a humane 'finger, grew in the Ore, as if they had been parts and 'branches of trees. And doth make full recital of 'Earth renewing it ſelf with Salt-petre; as alſo of 'the Ore of Vitriol growing into Vitriol it ſelf. Add 'to this that which *Munſter* tells us, that Nature doth 'figure pure ſilver into the form of Trees, Rods, or 'Hairs, *&c.*

Ib. p. 371.

P. 364, 365.

Sebaſt. Munſt. Geogr. p. 7.

I have been the more large in this point, to prove the growth and vegetability of Metals and Minerals, becauſe it is not of the leaſt concern in the promoting of Mineral knowledge: and I could have added more teſtimonies, but theſe being from moſt approved Authors, I hold to be ſufficient: Onely I ſhall commend ſome particulars deduced from hence, to be inquired of by all perſons that love metallick knowledge, and have opportunities and abilities to ſearch after the ſame. As alſo to all thoſe that travel where any Mines are, and eſpecially to all ingenious perſons that are Overſeers of Mines, or imployed about them, or work in them, to take notice of theſe few Inquiries.

1. To obſerve whether Earths, of any ſort, or Stones do grow and increaſe, and after what order and faſhion?

2. And that all thoſe in our own Nation, or elſewhere, that work about Allom and Vitriol, would obſerve how their Ores do lie and are found, and whether they increaſe or not?

3. And ſeeing our Nation hath ſtore of Tin and Lead Mines, that they would obſerve, whether their Ores grow, or not, and in what manner?

4. And in Tin and Lead Mines, and all other, as of Copper, Silver, Gold, Quickſilver or Cineber, and of Iron, whether any ſuch liquid matter may be found as the *Germans* call *Gur*, or not; and of what colours and qualities, as it ſeems the water found at *Anneberg* that yielded Silver, was blew; and that which *Paracelſus* calls the *primum ens auri*, was like red water; and that of Quickſilver he calls blood, or not?

5. That inquiry may be made whether any ſteams ariſing in Mines, do grow into a metalline ſubſtance, or not?

6. Laſtly, and to inquire, whether where Ores are wrought out, that they do after ſome years renew and grow again, or not?

CHAP. IV.

Of the Cauſes aſsigned by the moſt approved Authors for their generations, both efficient and material, and the manner thereof.

FOr the material and efficient cauſes, and manner of the generation of Metals; We ſhall enumerate ſome opinions of the chief Authors, and leave the Reader to chuſe which he judgeth moſt probable, or moſt true; becauſe we mean not to dogmatize nor impoſe upon any, but rather to move all men to a diligent ſearch after the things of this nature, that (if poſſible) the truth of their generations may be found forth, and diſcovered.

In the firſt place we ſhall give the opinion of the *Ariſtotelians*, and to eſchew tedioufneſs, ſhall tranſcribe what Dr. *Jorden* hath written in that caſe, with his cenſure upon it, and his own opinion adjoyned; becauſe that little Tract of his may be in few mens hands, and hard to be got; who relateth it thus: ‘For
‘the manner of generation of Minerals, although it be
‘alike in all, yet it differs from the generation of ani-
‘mate bodies, whether animals or vegetables, in this,
‘that having no ſeed, they have no power, or inſtinct
‘of producing other individuals, but have their ſpecies
‘perpetuated, *per virtutem ſeu ſpiritum ſemini Ana-*
‘*logum*, by a ſpiritual ſubſtance proportionable to
‘ſeed, which is not reſident in every individual, as it
‘is in animals and plants, but in their proper wombs.
‘This (ſaith he) is the judgment of *Petrus Severinus*,
‘how-

Of Nat. Bath, &c. c. 11. p. 53, 54, 55, 56, 57, 58, 59.

Cap. 2.

‘however he doth obſcure it by his *Platonical grandiloquence.* And as there is not *vacuum in corporibus*, ſo much leſs *in ſpeciebus*; for that the ſpecies are perpetuated by new generations, is moſt certain, and proved before: that it is not out of the ſeeds of individuals, is evident by this, that if Minerals do not aſſimilate nouriſhment by attraction, retention, concoction, expulſion, &c. for the maintenance of their own individual bodies; much leſs are they able to breed a ſuperfluity of nouriſhment for ſeed. And how can they attract and concoct nouriſhment, and expel excrements, which have no veins nor fibres, nor any diſtinct parts to perform thoſe Offices withal? Moreover they are not increaſed as Plants are, by nouriſhment; whereas the parts already generated, are extended in all proportions by the ingreſſion of nutriment, which fills and enlarges them: But onely are augmented externally upon the ſuperficies by ſuperaddition of new matter concocted by the ſame virtue and ſpirit into the ſame *ſpecies*.

Eraſtus.
Caſerius.
Cæſalpinus.
Martinus.
Moreſinus.
Fachius.
Magyrus.
Libanius.

‘The matter whereof Minerals are bred, is much controverted; *Ariſtotle* makes the humidity of water and the dryneſs of earth, to be the matter of all Minerals: the dryneſs of earth to participate with fire, and the humidity of water with air; as *Zabarella* interprets it: ſo that to make a perfect mixt body, the four Elements do concur: and to make the mixture more perfect, theſe muſt be reſolved into vapour or exhalation, by the heat of fire, or influence from the Sun and other Planets, as the efficient cauſe of their generation: but the cauſe of their congelation to be cold in ſuch bodies as heat will reſolve.

‘This vapour conſiſting partly of moiſture, and

partly of dryneſs; if all the moiſture be ſpent, turns to
‘earth, ſalt, or concrete juices, which diſſolve in moiſture.
‘If ſome moiſture remain before congelation,
‘then it turns to ſtone. If this dry exhalation be unctuous,
‘fat, and combuſtible, then Bitumen, Sulphur, and
‘Orpiment are bred of it: if it be dry and incombuſtible,
‘then concrete juices, &c. But if moiſture do abound
‘in this vapor, then Metals are generated, which
‘are fuſible and malleable. And for the perfecting of
‘theſe generations, this exhalation is not ſufficient;
‘but to give them their due conſiſtence, there muſt
‘be the help of cold from Rocks in the earth, to congeal
‘this exhalation. So that here muſt be two efficients,
‘heat and cold. And for the better effecting
‘of this, theſe exhalations do inſinuate themſelves into
‘ſtones, in the form of dew or froſt, that is, in little
‘grains: but differing from dew and froſt in this, that
‘theſe are generated after that the vapour is converted
‘to water; whereas Minerals are generated before
‘this converſion into Water. But there is doubt
‘to be made of froſt, becauſe that is bred before the
‘converſion of the exhalation into Water, as may
‘appear, *Meteor.* 1. According to this aſſertion,
‘there muſt be two places for the generation of Minerals:
‘the one a matrix where they receive their
‘eſſence by heat, in form of an exhalation; and from
‘thence they are ſent to a ſecond place, to receive
‘their congelation by the coldneſs of Rocks. And
‘from this matrix come our Mineral waters, and not
‘from the place of congelation.

Meteor. 3. c. ult.
Cæſalp. l. 3. c. 1.

Liban. de Nat.
Metall. c. 14.
Carerius. 178.

Septal. in Hyp.
de aere, aqu,
&c.

‘This is the generation of Minerals, according to
‘*Ariſtotle*; but it is not ſo clear, but that it leaves
‘many ſcruples, both concerning the matter and efficients.

'cients. For the matter, it ſeems not probable that water and earth ſhould make any thing but mud and dirt; for you can expect no more from any thing then is in it, the one is cold and dry, the other cold and moiſt; and therefore as fit to be the matter of any other thing, as of particular Minerals. And water, whereof principally Metals are made to conſiſt, is very unfit to make a malleable and extenſible ſubſtance, eſpecially being congealed with cold, as we may ſee in Ice. But ſome do add a mineral quality to theſe materials, and that ſimple water is not the chief matter of Metal, but ſuch as hath imbibed ſome mineral quality, and ſo is altered from the nature of pure water. This aſſertion doth preſuppoſe Minerals in the earth before they were bred, otherwiſe what ſhould breed them at the firſt, when there was no mineral quality to be imparted to water? Again, this mineral quality either gives the water, or the vapour of it the eſſence of the Mineral; and then it is not the effect of water, but of the mineral quality, or the potential faculty to breed it. If the eſſence, then this metalline water or vapour, muſt have the form of the Metal, and ſo be fuſible and malleable. If it have onely the power and potential faculty, then the generation is not perfected, but muſt expect further concoction. This concoction is ſaid to be partly by heat, and partly by cold; if by heat, it muſt be in the paſſages of the exhalation, as it is carried in the bowels of the earth. For afterwards, when the exhalation is ſetled in the ſtones, the heat is gone. Now if the concoction be perfected before the exhalation be inſinuated into the ſtones, as it muſt be, if it be like dew, then it is perfect Metal, and neither

‘is able to penetrate the ſtones, nor hath any need of
‘the cold of them to perfect the generation. If by
‘cold, it is ſtrange that cold ſhould be made the principal
‘agent in the generation of Metals, which generates
‘nothing; neither can heat be the efficient of
‘theſe generations. Simple qualities can have but
‘ſimple effects, as heat can but make hot, cold can but
‘cool, *&c.* But they ſay that cold doth congeal Metals,
‘becauſe heat doth diſſolve them. I anſwer, the
‘rule is true, if it be rightly applied; as we ſee Ice
‘which is congealed by cold, is readily diſſolved by
‘heat. But the fuſion of Metals cannot properly be
‘called a diſſolution by heat, becauſe it is neither reduced
‘to water or vapour, as it was before the congelation
‘by cold; nor is it permanent in that kind
‘of diſſolution, although after fuſion it ſhould be kept
‘in a greater heat then cold could be which congealed
‘it. For the cold in the bowels of the Earth cannot
‘be ſo great, as it is upon the ſuperficies of the Earth,
‘ſeeing it was never obſerved that any Ice was bred
‘there. Wherefore this diſſolution which is by fuſion,
‘tends not to the deſtruction of the Metal, (but doth
‘rather make it more perfect) as it ſhould do according
‘to the former rule rightly applied. And therefore
‘this diſſolution by fuſion, doth not argue a congelation
‘by cold: which being in the paſſive elements,
‘doth rather attend the matter then the efficient
‘of generations: for it is apt to dull and hebetate
‘all faculties and motions in Nature, and ſo to
‘hinder generations, rather then to further any. It
‘is heat and moiſture that further generations, as *Ovid*
‘ſaith, *Quippe ubi temperiem ſumpſere humorque calorque concipiunt.*

Valeſius Sac. Philoſ. c. 49.

Singularium, l.1.part.1.

‘And thus much, he ſaith, for *Ariſtotles* generation of Minerals; where the vapours or exhalations do rather ſerve for the collection or congregation of matter in the Mines, then for the generation of them, as *Libanius* doth rightly judge. *Agricola* makes the matter of Minerals to be *ſuccus lapideſcens metallificus, &c.* and with more reaſon, becauſe they are found liquid in the earth. *Gilgill* would have it aſhes, *Democritus* lime: but theſe two being artificial matters, are no where found in the earth. The Alchymiſts make Sulphur and Mercury the matter of Metals; *Libanius* Sulphur and Vitriol. But I will not ſtand upon diſcourſing of thoſe materials, becauſe it makes little to my purpoſe. It is enough for my purpoſe to ſhew the manner of theſe generations; which (ſaith he) I take to be this.

De nat. Metal. c.10.

‘There is a ſeminary ſpirit of all Minerals in the bowels of the Earth, which meeting with convenient matter, and adjuvant cauſes, is not idle, but doth proceed to produce Minerals, according to the nature of it, and the matter which it meets withal: which matter it works upon like a ferment, and by its motion procures an actual heat, as an inſtrument to further its work, which actual heat is increaſed by the fermentation of the matter. The like we ſee in making of Malt, where the grains of Barley being moiſtned with water, the generative ſpirit in them is dilated, and put in action; and the ſuperfluity of water being removed, which might choke it, and the barley laid up in heaps, the ſeeds gather heat, which is increaſed by the contiguity of many grains lying one upon another. In this work Nature's intent is to produce more individuals according to the nature ‘of the ſeed, and therefore it ſhoots forth in ſpires; but the Artiſt abuſes the intention of Nature, and converts it to his end; that is, to increaſe the ſpirits of his Malt.

‘The like we find in Mineral ſubſtances, where this ſpirit or ferment is reſident, as in Allom and Copperas Mines; which being broken, expoſed, and moiſtned, will gather an actual heat, and produce much more of thoſe Minerals, then elſe the Mine would yield; as *Agricola* and *Thurniſer* do affirm, and is proved by common experience. The like is generally obſerved in Mines, as *Agricola*, *Eraſtus*, *Libanius*, *&c.* do avouch out of the dayly experience of Mineral men, who affirm, that in moſt places, they find their Mines ſo hot, as they can hardly touch them. Although it is likely that where they work for perfect Minerals, the heat which was in fermentation whileſt they were yet in breeding, is now much abated, the Minerals being now grown to their perfection. And for this heat, we need not call for the help of the Sun, which a little cloud will take away from us; much more the body of the Earth, and Rocks; nor for ſubterraneal Fire. This inbred heat is ſufficient, as may appear alſo by the Mines of Tin-glaſs, which being digged, and laid in the moiſt air, will become very hot. So Antimony and Sublimate being mixed together, will grow ſo hot as they are not to be touched. If this be ſo in little quantities; it is likely to be much more in great quantities and huge rocks. Heat of it ſelf differs not in kind, but onely in degree, and therefore is inclined no more to one ſpecies then to another, but as it doth attend and ſerve a more worthy and ſupe-

Carer p. 212.

‘riour faculty, ſuch as this generative ſpirit is. And this ſpirit doth convert any apt matter it meets withal to its own ſpecies by the help of heat; and the Earth is full of ſuch matter, which attends upon the ſpecies of things. And oftentimes for want of fit opportunity and adjuvant cauſes, lies idle, without producing any ſpecies: but is apt to be tranſmuted by any mechanical and generative ſpirit into them. And this matter is not the Elements themſelves, but ſubterraneal ſeed placed in the Elements; which not being able to live to themſelves, do live unto others. This ſeminary ſpirit is acknowledged by moſt of *Ariſtotles* Interpreters, (and *Moriſinus* calls it *Elpheſteria*) not knowing how otherwiſe to attribute theſe generations to the Elements. And this is the cauſe why ſome places yield ſome one mineral ſpecies above another. *Quippe ſolo natura ſubeſt. Non omnis fert omnia tellus.* The ſeminary ſpirit hath its proper wombs, where it reſides, and forms his ſpecies according to his nature, and the aptneſs of his matter. But as *Severinus* affirms of animal ſeeds, that they are in themſelves Hermaphroditical, and neither maſculine nor feminine, but as they meet with *ſupervenient* cauſes. So it is in theſe Mineral ſeeds and ſpecies, which in one womb do beget divers ſorts of Minerals, either according to the aptneſs of the matter, or the vigour of the ſpirits.

Fabius.
Martinus.
Moriſius.
Magyrus.
Libani.
Velcurio.
Valeſius.
Carerius.
Eraſtus, &c.

Thus far this learned Author, whoſe reaſons we ſhall not cenſure, nor confute his opinion, which may paſs with as much probability as any others; but leave every one to his own liberty in judging. Onely we ſhall note one thing to the Reader to be conſidered of; and that is, where he makes Plants to be nouriſhed and augmented by the ingreſſion of nutriment, which fills and inlarges them; but that Minerals are onely augmented externally upon the ſuperficies, by ſuperaddition of new matter concocted by the ſame virtue and ſpirit into the ſame ſpecies. Of this we ſhall offer theſe things:

1. As for Plants we take it for a probable truth (though ſome may look at it as a new fanſie and paradox) that the true and proper generation of the moſt (if not of all) Plants, is in the former generant Plant that did produce the ſeed in its husk or covering; and that the ſeeds contain in them a Plant of its own kind, as that was of that did produce the ſeed, though not to be diſcerned by our ſenſes, nor, perhaps, by the beſt microſcopes, becauſe in many the little Plant contained in that husk or covering, is in ſo extream minute parts, and artificial means not yet found forth, to cauſe them to open themſelves; nor due obſervations had from time to time as they open and diſplay themſelves in their ſeveral wombs in the Earth. And that after they are fallen, or caſt into fit wombs in the Earth, that the warm and moiſt vapours, or ſteams of the Earth, as an external and adjuvant cauſe, doth ſoften and diſſolve the husk, covering, or ſhell, and excite and ſtir up that heat in the ſeed, or little Plant (which is the true agent and efficient cauſe of its increaſe and growth) that before lay as it were idle, and aſleep; by which means that little *embrio* doth open and expand it ſelf, and receives in by its pores, or cavities of thoſe parts ordered for roots (whether by attraction, or propulſion of its heat and moiſture by the ſteams of Earth and its ſaline atoms, I ſhall not here determine) the fit warm vapours, and aſſimilates it

to its own nature. And as this is (as we conceive) the growth of Plants, though commonly called their generation; ſo we commend this to be inquired of by all induſtrious perſons, that if Nature (as is moſt probable) contain in her Cabinet the ſecret ſeeds of Minerals, then why may ſhe not, meeting with fit matter and adjuvant cauſes, have thoſe ſmall ſeminary particles ſtirred up and put into motion, grow and expand themſelves in the manner of Plants, and by taking in new matter grow and increaſe. This I onely offer as fit to be noted and conſidered of.

2. The other thing that I would note is, That though Plants when young, may receive their nutriment, by the matter having ingreſſion by their pores; yet when they are grown older, and their truncks great and hard, it is probable that then their growth is by ſuperaddition of more matter to their outward parts, and aſſimilating it into their ſpecies. For it is generally in the North parts of *England* (eſpecially in old Oaks) that yearly great ſtore of ſap ariſeth betwixt the bark and the trunck, which afterwards hardens into wood, like unto the other: and if this be a truth, as all our Carpenters, and buyers of Timber affirm, if Metals do but increaſe by addition of new matter to the ſuperficies, then in ſome ſort it differs not from the increaſe of Trees when grown great and old. But if the relation given by *Galen*, and approved of by *Agricola*, be true; that Lead being placed in a moiſt Cellar or ſubterranean rooms, where the air is groſs and turbid, will be increaſed both in bulk and weight; then it muſt probably be by taking in ſome parts of that groſs air, or the mineral particles contained in it, by which it makes protruſion of its parts, and

Gal. de Simp. Med. fac. p. 2124.
Agric. de ort. & cauſ. ſubter. p. 519.

and getteth an increaſe in weight. By all which we may learn to obſerve :

1. That it may be that the ſeeds of Metals riſing in ſteams, may ſometimes, finding a fit room or vault, ſetle together, and in time become an hardned and metalline ſubſtance.

2. Or that other-ſometimes thoſe mineral ſeeds may become ſetled in ſome holes and cavities of rocks, in the form of water, or of that thicker ſubſtance that the *Germans* call *Gur*, and ſo in continuance of time grow to be a Metal.

3. Or that after they be hardned into a metalline ſubſtance, if the place will give leave, may protrude it ſelf further and further (as the roots of Vegetables do in hard Rocks and old Walls) by virtue of the mineral ſteams, piercing from the root, through inſenſible pores, or at leaſt may ripen from one degree of perfection to another; as from Lead to Silver, and the like. For my ſelf and divers other ingenious perſons have obſerved, that in the late Wars, when many Caſtles and other old buildings were diſmantled or demoliſhed, that the Leads that were taken from off them, would have ſold dearer then any other Lead; and I have heard divers perſons of credit affirm, that it would yield very conſiderable quantities of ſilver, and the longer it had laid, the more. Which (if true) is an evident argument, that either by long lying, the Lead being the ſofter part, waſted away with the Sun and Weather, and ſo left more of ſilver in the ſame bulk of matter, then the ſame bulk of Lead contained, when newer and freſher; or elſe that the Silver in the Lead (as all Lead contains ſome more or leſs) did maturate ſome part of the Lead into its own more

noble Nature, or got increaſe from the beams of the Sun, or particle in the Air, or both. And theſe noble hints I onely give, as worthy to be conſidered of, and inquired after.

Now we ſhall come to the other opinion of the cauſes and manner of the generation of Metals, which is that of the myſtical Authors, learned Chymiſts, and expert Mineraliſts, which we ſhall handle fully and at large. And for order ſake, we may conſider: Firſt the matter, of which they hold they are generated. Secondly, the efficient cauſe of their generation. Thirdly, the manner how they are generated.

1. The ancient Chymical Philoſophers held, that the matter out of which the Metals were generated, were Sulphur and Mercury; but *Baſilius Valentinus*, *Paracelſus*, and the later Chymiſts have added Salt as a third; which notwithſtanding though they ſeem to make them three in number, and properties, yet they intended but one Homogeneous ſubſtance or eſſence; and the moſt of them joyned Salt with the Sulphur, ſo that in effect they held but two. And this Sulphur and Mercury they did not mean of thoſe that are vulgar, as the moſt of their adverſaries have too groſly miſtaken; and therefore it will be neceſſary in the firſt place, to clear what they underſtand by Sulphur, and Mercury, and how thoſe two are firſt generated.

No. lum. Chym. Tr. 3. p. 309. 1. Their Sulphur and Mercury they variouſly deſcribe, as *Sendivogius* ſaith: *Prima materia metallorum, & principalis eſt, humidum aeris caliditate mixtum, hanc Philoſophi Mercurium nominarunt, qui radiis ſolis & lunæ gubernatur in mari Philoſophico.* The firſt and principal matter of Metals is, the humidity of the Air mixt with calidity; this the Philoſophers have named Mercury, which is governed with the rayes of the Sun and Moon in the Philoſophers Sea. *Secunda eſt terræ caliditas ſicca, quam vocarunt Sulphur.* The ſecond is the dry calidity of the Earth, which they have called Sulphur. And again he ſaith, *Quatuor elementa in prima operatione naturæ ſtillant per Archæum naturæ in terræ centrum vaporem aquæ ponderoſum, qui eſt metallorum ſemen, & dicitur mercurius propter ejus fluxibilitatem, & uniuſcujuſque rei conjunctionem, non propter eſſentiam, aſſimilatur Sulphuri propter internum calorem, & poſt congelationem eſt humidum radicale.* The four Elements in the firſt operation of Nature, do diſtill by the *Archæus* (or Workman) of Nature, into the centre of the Earth, a ponderous vapour of Water, which is the ſeed of Metals; and is called Mercury, becauſe of its fluxibility and its conjunction with every thing, not becauſe of its eſſence; it is likened to Sulphur becauſe of its internal heat, and after congelation is the radical moiſture. *Treviſan* defines Sulphur thus: *Sulphur enim aliud nihil eſt, quam purus ignis occultus in mercurio, qui longo ſucceſſu temporis excitatur, atque movetur motibus corporum cæleſtium, digeritque frigiditatem & humiditatem in mercurio pro varietate graduum decoctionis, & alterationis in diverſas formas metallicas, &c.* For Sulphur is nothing elſe then pure fire hid in the Mercury, which in long continuance of time is excited, and moved by the motions of the celeſtial bodies, and doth digeſt the coldneſs and humidity in the Mercury, according to the variety of the degrees of decoction and alteration, into divers metallick forms. Elſewhere he hath called Sulphur the maſculine agent

Ibid. ut ſupr.

Ib. Tr. 6. p. 320, 321.

Alchym. p. 766, 767.

fire and air, which in the metallick ſeed doth maturate and digeſt the two feminine paſſives of Earth and Water: becauſe that heat is an intrinſick and eſſential part of the Mercury it ſelf; to wit, the two more active elements in it, that is to ſay, the Air and Fire. Vid. Correct. Rich. Augl. And again, becauſe Sulphur is no other thing then the pure act of the Air and Fire making hot, digeſting, or decocting the Earth and Water proportionable to it ſelf, and Homogeneous in the Mercury. And *Geber* ſaith, it is nothing elſe but light and tincture; and others call it the moſt ripe part of the Mercury. Phyſ. Herm. p. 308. And the ingenuous and candid *Nollius* defines it thus: The Sulphur, with which *Argent vive* is impregnated, is not the vulgar Sulphur, but fire placed in the *Argent vive*, by which it is excocted into a Metal in the Mines by the intervening of Motion.

Ut ſupr. 2. Theſe two are not diſtinct, as though Mercury were one thing, and Sulphur another, as extraneous bodies one to another. For *Treviſan* ſaith, Sulphur is not ſomething ſeparate by it ſelf, without the ſubſtance of the Mercury, neither common Sulphur; otherwiſe the matter of Metals ſhould not be Homogeneous, which is repugnant to the opinion of all Philoſophers. Likewiſe *Morienus* and *Aros* ſay: Our Sulphur is not vulgar Sulphur, but fixt and not volatile; of the nature of Mercury, and not of any other thing whatſoever. Ib. ut ſupr. And *Treviſan* again ſaith: Some perſons do judge amiſs, that in the procreation of Metals ſome Sulphureous matter doth intervene; but it is manifeſt on the contrary, that Sulphur is included in his Mercury when Nature doth operate.

3. Now for the generation of their Mercury or viſcous fatneſs, they deſcribe it thus: *Æthereus mundi*

ſpiritus, quem animam appellitant, duo elementa aquam & terram inter ſe committit, atque ex utriſque conjunctis ſpiritum quendam prolicit unctuoſum, eumque in centrum terræ demittit, ut ex eo ſurſum elevetur, & in matricem deferatur debitam, ac in ea in argentum vivum ſulphure, & ſale naturæ imprægnatam concoquatur. The Æthereal ſpirit which they call the ſoul, doth commix betwixt themſelves the two Elements, Water and Earth; and of them both being conjoyned, doth draw forth a certain unctuous ſpirit, and doth dimit it down into the centre of the Earth, that from thence it may be lifted upwards, and be carried into a fit matrix, and in it may be concocted into *Argent vive* impregnated with the ſulphur and ſalt of Nature. And *Sendivogius* thus: *Res omnes naſci ex aere liquido vel vapore, quem elementa perpetuo motu in viſcera terræ ſtillant, hunc poſtquam naturæ Archæus accepit; per poros ſublimat, & unicuique loco ſua ſagacitate tribuit, & ſic locorum varietate, res etiam proveniunt, & naſcuntur variæ. Quando enim ex terræ centro ſublimatur vapor ille, tranſit per loca vel ſicca, vel calida. Si igitur tranſit vapor per loca calida & pura, ubi pinguedo ſulphuris parietibus adhæret, vapor ille quem Philoſophi mercurium Philoſophorum dixerunt, accommodat ſe & jungitur illi pinguedini quam poſtea ſecum ſublimat, & tunc fit unctuoſitas relicto nomine vaporis, accipit nomen pinguedinis.* That all things do grow of the liquid air or vapour, which the Elements do diſtil by a perpetual motion into the bowels of the Earth, which after the *Archæus* (or Workman) of Nature hath taken, he doth ſublime it through the pores, and doth diſtribute to every place by his ſagacity; and ſo by the variety of places, various things

Noll. Phyſ. Herm. l. 8. c. 3. p. 313.

No. lum Chym. Tr. 6 p. 320.

do come and grow. For when this vapour is ſublimed from the centre of the Earth, it paſſeth by places either drie or hot. If therefore the vapour paſs by places hot and pure, where the fatneſs of Sulphur doth cleave to the walls, that vapour which the Philoſophers have called the Mercury of Philoſophers, it accommodateth it ſelf, and is joyned to that fatneſs; which afterwards it ſublimes with it ſelf, and then it is made an unctuous thing, the name of vapour being loſt, it receiveth the name of fatneſs.

Now having deſcribed their Sulphur and Mercury, and how they are generated, and how they differ only in property, and not in homogeneal eſſence, which they hold to be the matter of the generation of metals; We ſhall more diſtinctly handle it in order, and from what is already ſaid, and to be ſhewed, deduce their fuller meaning.

They make the matter of the Minerals threefold. 1. The moſt remote matter, which they call the firſt; and this *Nollius* doth call the Æthereal ſpirit, which doth commix the two elements of Water and Earth, and draws a certain mineral ſpirit forth of them. And *Treviſan* ſaith it is the four Elements. *Etenim elementa quatuor æque ſunt ad informationem aſini vel bovis apta, ac ad metalla.* For the four Elements are equally fitted for the information of an Aſs, or Oxe, as they are for Metals. And *Sendivogius* ſaith, that the Elements do continually diſtil down into the centre of the Earth, a ponderous vapour or water, which is again ſublimed into divers matrixes.

2. The remote matter they eſtabliſh to be this vapour mixt with the Sulphur that ſtuck to the Walls, growing into a middle ſubſtance like to fat or glutinous water.

3. The third is the *proxime*, or next matter of Metals, and that is this fat and glutinous ſubſtance, grown more thick, and may be that which before we have named *Gur*: which *Treviſan* thus excellently defines. *Apprime ſciendum materiam primam eſſe rem ipſam, in quam immediate ſpecifica forma introducitur, uti prima hominis materia, eſt utrumque viri ſemen & mulieris.* Firſt of all we are to know, that the firſt matter (to wit of Metals) is that very thing, into which immediately the ſpecifick form is introduced, as the firſt matter of a man, is both the ſeed of the man and woman. And this is it they call their metallick ſeed, in the neareſt power; for after it be conceived and brought to this, it cannot then be changed into any thing, but into ſome kind of Mineral. From all which, we may note theſe things.

1. That the ſperm of Metals (to wit in its firſt production) is not different from the ſperm of other things, to wit, an humid vapour.

2. This metallick ſeed is not like the animal and vegetable ſeed, eaſily to be known or had; for they ſay of it: *Semen minerale vel metallorum creat natura in viſceribus terræ, propterea non creditur tale ſemen eſſe in rerum natura, quia inviſibile eſt.* Nature doth create the mineral or metallick ſeed in the bowels of the Earth, therefore it is not believed that there is ſuch a ſeed in the Nature of things, becauſe it is inviſible. And again, The Mineral ſeed is known of the Philoſophers. And laſtly: *Semen autem metallorum filii tantum doctrinæ noverunt.* But the Sons of Art have onely known the ſeed of Metals.

No. lum. Chym. Tr. 6. p. 319.

3. This metallick ſeed is but one, and not divers; for ſo he witneſſeth, *Sunt qui opinentur, Saturnum*

Ib. Tr. 4. p. 313.

habere aliud ſemen, aurum quoque aliud, & ſic conſequenter metalla reliqua, ſed vana ſunt iſta, unicum tantum eſt ſemen, idem in Saturno, quod in Auro invenitur, idem in Luna, quod in Marte. There are thoſe that imagine that *Saturn* hath one ſort of ſeed, and Gold another; and ſo conſequently the reſt of the Metals: but theſe are vain, there is onely one ſeed, the ſame in *Saturn* that is found in Gold, the ſame in *Luna* that is in *Mars*. And *Baſilius Valentinus*, far more fully, ſaith thus; Therefore obſerve and take notice, that all Metals and Minerals have onely one root, from which generally their deſcent is; he that knoweth that rightly, needs not to deſtroy Metals to extract the ſpirit from one, the ſulphur from a ſecond, and the ſalt from a third. For there is a nearer place yet, in which theſe three, Spirit, Soul, and Body, lie hid in one thing, well known, and may with great praiſe be gotten. He that knoweth exactly this golden ſeed, or this magnet, and ſearcheth throughly into its properties, he hath then the true root of life, and may attain unto that his heart longeth for. Wherefore I intreat all true lovers of Mineral Science, and Sons of Art, diligently to inquire after this metallick ſeed or root, and be aſſured that it is not an idle *chimara* or dream, but a real and certain truth.

Elucidat. of the 12 gates, p 117.

Sometimes (and perhaps not untruly) they affirm the Metals to be generated of the element of Water; as *Helmont*, who proves not onely that metallick bodies, but alſo all other Concretes to have their riſe from thence, and demonſtrateth the immutability of elemental Water, as well as of the homogeneous Mercury of Metals: Who ſaith, *Eſtque ideo in ipſo Mercurio, prout in elementis, ratio propinqua indeſtructi-*

Progym. Meteor. p.70.

ſtructibilitatis. There is therefore in Mercury it ſelf (meaning metallick Mercury) as in the Elements, the neareſt cauſe or reaſon of indeſtructibility. And that Metals were generated forth of the Element of Water, I find *Plato* holding that opinion, who ſaith, *Aquæ genera duo ſunt præcipua, unum humidum* ὑγρὸν, *alterum fuſile* χυτὸν. There are two chief ſorts of Water, one moiſt, the other fuſile, or to be poured forth. And a little after, he ſpeaketh thus of the Water he calleth fuſile: *Ex his vero quas aquas fuſiles appellavimus, quod ex tenuiſſimis leviſſimiſque fit denſiſſimum, uniforme, ſplendidum, flavumque, pretioſiſſima res eſt, aurum floreſcens per petram compactum eſt.* But of theſe waters which we call fuſile, (or to be melted) gold flowering through the Rock is compacted, becauſe it is made of moſt tenuious, moſt ſoft (or tender) things, moſt denſe, uniform, ſplendent, yellow, and is a moſt pretious thing. The reſt may be ſeen more fully in the place quoted. And that *Paracelſus* was of opinion that Metals had for their material cauſe Water, is manifeſt; for he ſaith, *Sic ergo mirabili conſilio Deus conſtituit, ut prima materia naturæ eſſet aqua, mollis, levis, potabilis: & tamen fœtus ſeu fructus ipſius eſt durus; ut metalla, lapides, quibus nihil durius eſt.* So therefore God hath ordered by a wonderful counſel, that the firſt matter of Nature ſhould be Water, ſoft, gentle, potable. And notwithſtanding the off-ſpring or fruit of it is hard; as Metals, Stones, then which nothing is more hard.

Timæ. Plat. p.Græc. 488. Latin. 718.

Lib. de Miner. Tr. 1. p. 342.

And that Water was the matter out of which Metals and all other mixt bodies were framed, ſeems not altogether diſliked by that honourable and learned perſon Mr. *Boyle*, who ſaith; Yet thus much I ſhall tell

Scept. Chym. p. 118.

tell you at preſent, that you need not fear my rejecting this opinion for its novelty; ſince, however the *Helmontians* may in complement to their Maſter, pretend it to be a new diſcovery; yet though the Arguments be for the moſt part his, the opinion it ſelf is very ancient, as there he further proveth at large: to which for brevity ſake, I remit the Reader.

But no Author (in my judgment) hath more fully, plainly, and truly deſcribed the matter, manner, and order of the generation of Minerals, then that learned and moſt experienced Chymiſt *Helmont* hath done; and therefore we ſhall give you his opinion at full, though ſome part of it hath been recited before; who ſaith: ‘*Non raro nempe contingit, quod metallarius in fodinis, ſaxa diffringens, dehiſcat paries & rimam det, unde tantillum aquæ, ſubalbidæ vireſcentis, manavit, quod mox concrevit inſtar ſaponis liquidi* (Bur *voco*) *mutatoque deinceps pallore ſubviridi, flaveſcit, vel albeſcit, vel ſaturatius virideſcit.* The *Engliſh* of it you have before. And from thence he draweth theſe concluſions. ‘*Sic enim viſum eſt, quod alias intus abſque ſaxi vulnere fit. Quia ſuccus ille interno efficiente perficitur. Eſt ergo prima ſeminis metallici vita, in condo, ſive promptuario loci, homini plane incognita. Ac ubi ſemen in lucem, liquore veſtitum prodit, & Gas incæpit ſulphur aquæ inquinare, vita eſt ſeminis media, ultima vero cum jam indureſcit.* So that it ſeemeth, it is made otherwiſe within, without the breach (or wound) of the ſtone. Becauſe that juice, or liquor, is perfected by an internal efficient. Therefore the firſt life of the metallick ſeed is in the cup, hole, or little cellar of the place, altogether unknown unto man. But when

Magn. oport. p. 157.

‘the ſeed doth appear unto light inveſted, or cloathed, ‘with the liquor, and the Gas hath begun to ſtain, or ‘corrupt the ſulphur of the Water, it is the middle ‘life of the ſeed; but is the laſt life when it beginneth ‘to harden. To this we ſhall onely add the opinion of the Author of the *Arcæ Arcani artificioſiſſimi apertæ*, who ſaith thus. Which, becauſe it is large, I ſhall onely give in *Engliſh*. ‘Therefore it is to be ‘known, that Nature hath her paſſages and veins in the ‘Earth, which doth diſtil Waters, ſalt, clear and turbulent. For it is always obſerved by ſight, that in ‘the Pits, or Groves of Metals, ſharp and ſalt Waters ‘do diſtil down. While therefore thoſe waters do ‘fall downwards, (for all heavy things are carried ‘downwards) there are ſulphureous vapours aſcending from the centre of the Earth, that do meet them. ‘Therefore if the waters be ſaltiſh, pure and clear, ‘and the ſulphureous vapours pure alſo; and that they ‘embrace one another in their meeting, then a pure ‘Metal is generated; but in defect of purity, an impure ‘Metal: in elaborating of which, Nature ſpreadeth ‘near, or about a thouſand years, before that ſhe can ‘bring it to perfection; which cometh to paſs either ‘by reaſon of the impurity of the ſalt Mercurial ‘waters, or of the impure ſulphureous vapours, When ‘theſe two do embrace one another, ſhut up cloſe in ‘the rocky places; then of them a moiſt, thick, fat ‘vapour doth ariſe by the operation of natural ‘heat, which taketh its ſeat where the air cannot ‘come (for elſe it would fly away) of which vapour ‘then a mucilaginous and unctuous matter is made, ‘which is white like Butter; which *Matheſius* doth ‘call *Gur*, which may be clam'd like Butter; which

Theatr. Chym. Vol. 6. p 305.

‘I (ſaith this Authour) can alſo ſhew in my hand, a-‘bove the Earth, and forth of the Earth. The La-‘bourers in the Groves do often find this matter ‘which is called *Gur* ; but of it nothing can be prepa-‘red, becauſe it is not known what was the intention ‘of Nature in that place ; for a Marchaſite, as well as ‘a Metal, might equally have been made of it.

2. In the next place we come to the efficient cauſe of their generation ; which *Ariſtotle* and his followers have made external, ſome of them hot, and ſome of them cold, and ſome both ; vainly holding that the efficient cauſe in natural generations, did not enter the compound, being ſeduced (as is moſt probable) by the ſimilitudes taken partly from artificial and manual operations, as the Painter, or Statuary, being the efficient cauſe of the Picture or Statue, were external and ſeparate from them, after they were wrought and finiſhed : Not conſidering that theſe, and the like, make no alteration intrinſecally in the compound, but onely are converſant about the figuring, and altering the dimenſions of quantity : partly from humane, animal, and vegetative generations, wherein they conceive the male and female to be efficient cauſes of generation, and ſo to be external and ſeparate from the thing generated. Which is merely falſe, for the male and female are but inſtrumental, or artificial cauſes of moving and ejaculating the ſeeds into the due matrix : which ſeeds being joyned together, become agent, and patient (being excited by the heat of the matrix, as an adjuvant cauſe) and the intrinſecal efficient cauſe is contained in them, which we call the *Archæus*, or ſeminal *Idæa* that doth form and organize the body, according to the ſpecies from whence it

was derived, if the matrix be proper, and of due kind for it. And the male and female in this do no more then the husbandman that ploweth and tilleth the earth, and then caſteth in the ſeed, (onely Nature hath prepared and provided ſeed intrinſecally in the male and female, which the husbandman muſt have elſewhere provided by Nature for him *ab extra*) being no intrinſecal, or efficient cauſe of its generation or growth; but onely that particle of vital air or *æther* within it. Which being the Faber or *Archæus*, and excited with the hot and moiſt vapours in the Earth, or matrix, doth produce its like; or as the Holy Writ words it, gives to every ſeed its own body.

But to come to the true efficient cauſe of the generation of Metals (though what hath been ſaid might ſuffice) the ſubſtance ſeems to be this. That the Solar particles, celeſtial ſpirit, or internal and incombuſtible Sulphur (which is the true fire of Nature) hid in the viſcous matter or mercury, and excited and ſtirred up by the motion of the celeſtial bodies, central ſun, or ſubterraneous fire or heat (which we ſhall not take upon us to determine, but leave it to the judgment of the learned Reader) doth generate, perfect, and ripen Metals; as moſt of what hath been ſaid before, doth ſufficiently teſtifie. And all do conſent that Sulphur is the efficient cauſe, or father, and Mercury the paſſive or mother of all Metals.

Now for the manner of their generations, there hath been ſo much related in the paſſages of this Chapter, that we ſhall but onely add this ſhort collection. That the Water being ſharp and ſalt, and falling down in the ſubterraneous caverns and paſſages of the Earth, doth meet with the drie, ſulphureous, and warm ſteams that riſe from the lower parts of the Earth, do joyn together, and ſo becomes unctuous and fat, which ſetling in cloſe holes, and cavities of Rocks where the air cannot enter, as in a cloſe womb, is in length of time thickned into a ſoft ſubſtance, which they call *Gur*; and after by the warmth of the place, or womb, and its own internal fire, ſulphur, or heat, is concocted into a metallick body, pure or impure, according as the ſteams were, when they joyned together, and the place in which they are generated.

Vid. No. Lum. Chym. p. 314, 315.

CHAP. V.

Of the uncertainty of the diviſion of Foſſiles, their definitions, or deſcriptions, and number.

THe reaſon why I begin here with the diviſions of Foſſiles, is, becauſe I mean not to determine, but to propoſe, and the things being yet ſo far from being certainly known, that I dare but Sceptically treat of them, and recite what the opinions of Authors are in theſe particulars.

1. And firſt, That things may be plain to the Reader, as far as we are able to lay them open, by things digged forth of the Earth, commonly called *Foſſilia*, we underſtand all elementated, and perfectly mixt bodies, growing, found, and had either in the bowels of the Earth, or in the ſuperficial parts thereof, brought to the knowledge of our ſenſes by any means whatſoever; thereby not intending ſubterraneous animal, vegetables, nor any of their parts. Which are

ſo variouſly divided by Authors, that a man cannot well tell which of them to pitch upon, as the moſt perfect, but ſome of the chief of them we ſhall here recite, and leave the cenſure to others.

1. Muſ. Worm. c.1.p.1.

And firſt the learned *Wormius* doth thus define Foſſiles. *Eſt autem foſſile, corpus perfecte mixtum inanimatum, vitæ expers, peculiari forma, & virtute ſeminaria à deo in prima creatione dotatum, ut ſibi ſimile procreare, ſuamque ſpeciem propagare poſſit.* But a Foſſile is a body perfectly mixt, inanimate, void of life, endowed with a peculiar form, and ſeminary virtue of God in the firſt creation, that it might procreate a like to it ſelf, and might propagate its ſpecies. And after doth divide them into three ſorts. 1. Into middle Minerals; which have a middle nature, as it were betwixt ſtones and Metals; and of theſe he maketh four ſorts. 1. Earths. 2. Salts. 3. Sulphurs. 4. Bitumens. 2. Into ſtones, of which he maketh two ſorts. 1. Stones leſs precious. 2. Stones precious. 3. Into Metals, by which (he ſaith) he underſtands metallick bodies, meaning as well the Metals properly ſo called, as alſo thoſe bodies that are of kin or nearneſs to the Metals. Which I confeſs to me ſeemeth as comprehenſive a diviſion of Foſſiles as any other Author that I have read.

2. De re metal. l.1.c.1.p.6.

Secondly, *Encelius* divides them all but into two ſorts, that is to ſay, 1. Into the greater Minerals, which have their original from Sulphur and Mercury, and that theſe are all ductible and liquable. 2. Into the middle Minerals, or remote, which are not properly metallick bodies, as thoſe that draw their original from a very weak Mercury and Sulphur, or thoſe that conſiſt of *argent vive*, or ſulphur alone, as ſubventaneous eggs, or a Mole. This diviſion I leave as but defective, and to be cenſured by others.

3. 3. I cannot now but mention the Jeſuit *Cæſius*, who writ a huge Volume of Minerals, but grounded upon very little experience; in which notwithſtanding a curious fanſie may find many nice and ſpeculative queſtions handled, and according to his notions reſolved. It being the cuſtom of thoſe kind of men to ſeem ignorant of nothing, when indeed experimentally they ſcarce know any thing. He relateth that *Avicen* quoted by *Albertus*, *Agricola*, and others, do divide Foſſiles into four kinds; as Stones, Metals, Sulphurs, and Salts. And others likewiſe into four, to wit, remarkable Earths, concrete Juices, Stones, and Metals. Theſe and other diviſions he ſheweth, and ſeemeth to approve of them all, in theſe words. 'I ſay 'that the before-alledged diviſions are all uſeful, for 'they fitly enough do diſtribute the whole into its 'parts, which is the office of a good diviſion. Therefore '*Fallopius* and *Raynandus* do rightly commend the di'viſions of *Ariſtotle*, *Theophraſtus*, *Galen*, *Avicen*, and '*Albertus*; and that the ſaid *Fallopius* doth rightly 'prefer the fourfold diviſion of *Agricola*, into Earths, 'Juices, Stones, and Metals, as more clear then the reſt. And afterwards he forth of *Agricola*, doth enumerate ſix ſorts; which, with the reſt, I commend to be conſidered of. Mineralog. l. 1. c. 8. p. 129. Ibid. l. 2. c. 1. p 141.

4. 4. The Author of the *Aureus* Tract *De Lapide Philoſophico*, divides them into four ſorts, to wit, Stones, amongſt which the matter of every kind, and Earths are underſtood Salts of all ſorts, the middle Minerals, and Metals. P. 24.

5. 5. Laſtly, I ſhall onely add the diviſion uſed by

Treviſan, not ſo much regarding the exactneſs, as uſefulneſs, which he maketh four-fold. ‘The firſt ‘he calls of the firſt impoſition, which are vulgar and common Stones, in which there is a bare compaction ‘of the Elements. 2. The ſecond are the *media* ‘*mineralia*, or leſſer Minerals, as Salts, Aloms, Tackles, ‘Auripigments, Vitriols, Sulphurs, &c. 3. The third are the metallick bodies, or *mineralia majora*. 4. Of the fourth ſort are gems, and precious ſtones.

Epiſt. ad Tho. Bovon.

Now for the definitions and deſcription of what a Metal is, to diſtinguiſh it from other Foſſiles and compound bodies, we find the Authors as different in their opinions; and therefore the moſt learned and expert in Mineral knowledge, have for the moſt part omitted it, as too nice a difficulty and fruitleſs ſpeculation, as *Paracelſus*, who giveth this; and yet however, thought of it as good and true as the beſt of them; who ſaith, ‘He that goeth about to know what Me‘tals are, and from whence they ariſe; muſt under‘ſtand, that our Metals are no other thing, then the ‘beſt part and ſpirit of common ſtones, that is to ſay, ‘pitch, greaſe, fatneſs, oyl, and ſtone. For ſo hardly ‘are the things of Nature to be known, that they are ‘more eaſily to be known by ſimilitudes then Logical ‘definitions.

Lib. cœl. Phil. p. 126.

This definition is given by an *Ariſtotelian* thus: ‘*Metallum eſt corpus perfecte mixtum, & inanima*‘*tum, ex ſulphure & argento vivo, mixtis & tempe*‘*ratis in terræ venis, natum.* A Metal is a perfect ‘mixt body, and inanimate, ariſing from ſulphur and ‘argent vive, mixed and tempered in the veins of the ‘Earth. And firſt he thinks the definition to be ‘good, as conſiſting of a genus and difference. The

1. Jo. Magyr. Phyſiol. Peripatet. l. 5. c. 1. p. 321.

'genus he makes *corpus*, becauſe a Metal doth conſiſt of three dimenſions: and the difference he makes fourfold. 1. It is called a body perfectly mixt, to difference it from meteors; becauſe there is not ſo light a concourſe of the Elements in Metals as in Meteors. 2. It is called inanimate, to difference it from animate things, as Plants and Animals. 3. The matter of Metals is ſet down to be ſulphur and argent vive, as the father and mother of Metals. And when they are ſaid to grow of ſulphur and argent vive mixt and tempered together in the veins of the Earth, by which the efficient cauſe, and place or matrix of generation is ſignified.

2. Muſ. Worm. Sect. 3. c. 1. p. 113.

'*Wormius* gives this modeſt definition of a Metal. *Metallum eſt corpus perfecte miſtum, non vivens, ſed viventi æmulum, à Dee in venis creatum, ex terra ſubtiliſſima, & halitibus pinguibus ex terra & aqua, per calorem miſtis, ut inde ſulphureum & mercuriale ſemen fiat, ex quo metalla generari poſſunt: quæ accedente ſalino principio concreſcunt, & incrementa capiunt, donec pura, & perfecta reddantur, igne fuſilia, ictuque in longum & latum ductibilia.* A Metal is a perfect mixt body, not living, emulating life, created of God in the veins, of a moſt ſubtile earth, and ſteams being fat, from the earth, and water, mixed by heat, that from thence a ſulphureous and mercurial ſeed may be made, from whence Metals may be generated: which do joyn together, and take increaſe, by a ſaline principle coming to them, until they be made pure and perfect, being fuſible by fire, and by force to be drawn into length and bredth.

3. '*Schroderus* gives this deſcription: *Metalla ſunt corpora*

‘*corpora dura, ductilia ex ſucco ſalino ſine Mercurio, vi*
‘*ſui ſulphuris in terra coagulato.* Metals are hard bo-
‘dies, to be drawn (or ductible) coagulated of a ſaline
‘juice or Mercury, by the force of ſulphur, in the
‘earth.

Pharm. Med. Chym. l.3. c.9. p.42.

There might be many more definitions, or deſcriptions given of Metals, from many other Authors, but ſo defective, or imperfect, that I have onely inſtanced in theſe, to ſhew how lame this piece of learning is concerning Metals, that all ingenuous perſons may be ſtirred up to a farther ſearch into the nature and properties of them, to help to lead this knowledge towards perfection. And therefore we ſhall onely mention three particulars that may be obſerved from what hath been ſpoken before. 1. That if we take a Metal in the ſenſe of the firſt definition of *Magyrus*, then it may comprehend both thoſe that are ſtrictly called Metals (not excluding common *argent vive* to be one) and thoſe that are alſo called ſemi-metals, as Antimony and the like.

2. But if we take a Metal ſtrictly to be, a perfect mixt, conſtant and Mineral body, fuſible, ductible, or malleable, ariſing or generated of Sulphur and Mercury: and ſo the ſpecial difference of a Metal from all other Minerals to be its abiding the hammer, and *per ſe*, or of its own nature, without commixture of any other, to endure extenſion into length and bredth by force. Then quickſilver muſt be none of them, nor thoſe that are accounted ſemi-metals, as Antimony, Biſmuth, or Tin-glaſs, and the like; which of themſelves will not extend under the hammer, but with the commixion of ſome others will eaſily do it. For they make a ſemi-metal to be a perfect mixt body, leſs con-

ſtant, fuſible not ductible *per ſe*, compounded of a leſs perfect Mercury and Sulphur then the former. Its difference from other Minerals, to be its metallick colour, and fuſion; and from a Metal, that it will not (without mixture of ſome other) extend under the hammer, but proves brittle and frangible.

3. But if a metallick body be taken in the largeſt ſenſe, then it ſometimes comprehends not onely thoſe that are malleable *per ſe*, but thoſe called ſemi-metals, that will not extend under the hammer without commixtion of ſome other, and thoſe other Minerals that ſome Authors call *Cachimiæ & Marchaſitæ*; of all which we ſhall have occaſion to ſpeak hereafter.

In the next place we come to ſpeak of the number of the Metals, which commonly are accounted ſeven, according to the number of the ſeven Planets, which we ſhall let paſs, as a thing aſſumed by Analogy and ſimilitude, more then by certainty and truth; but becauſe they have been moſt anciently and commonly known more then others, they have got that repute and eſteem, which we ſhall not labour to take from them.

Lib. de Miner. p. 346.

Concerning this point we may take the judgment of *Paracelſus*, in ſtead of all; whoſe experience in Mineral knowledge was inferiour to none; who ſaith: 'But underſtand further of the generation of Metals, 'that there is a great number, and a diverſe variety of 'them. For a Metal is that which the fire can tame, 'and the Workman frame an inſtrument of; of which 'are Gold, Silver, Iron, Copper, Lead, Tin. For 'theſe are accounted Metals of all men. But furthermore, alſo there are certain other Metals, which

‘are not accounted Metals, either in the Writings or
‘Philoſophy of the Ancients, or by the vulgar, and
‘notwithſtanding they are Metals. Hitherto doth belong
‘*Zink*, *Cobalt*, which are tamed, and forged or
‘ſtamped by force of the fire; as alſo certain *Granates*
‘(ſo uſed to be called) of which there are many kinds,
‘and theſe are Metals. But there are many others
‘beſides theſe, that are not yet known unto me: as
‘are many differences in *Marchaſites*, in *Biſmuths*, in
‘other *Cachimies*, which yield Metals, but not yet
‘known or diſcovered. For the chief Metals are onely
‘known, that are more ready, and commodious for
‘uſe, as Gold, Silver, Iron, Copper, Tin, Lead:
‘The reſt are for the moſt part neglected through a
‘certain ſlothfulneſs; neither is there much care taken
‘about their properties. For neither the Smith,
‘nor Artiſt that worketh in Iron, or Tin, or Copper,
‘regardeth them: and yet they are Metals for other
‘Artificers not yet ſprung up; for none labours to
‘learn, except by one way and one Art. And a little
‘after he ſaith: But this Chapter of Metals doth teach Ibid. p.347.
‘that there are ſix Metals in number known unto me,
‘which alſo I have reckoned above: to which yet a
‘few more are to be added, to wit, three or four, alſo
‘known unto me; whoſe number and ſpecies do
‘hereafter follow. But it is of likelihood to me, that
‘yet a great number of them remains behind unknown.
‘For by the probation or eſſaying of Metals,
‘manifold trials or eſſays do offer themſelves,
‘which are of a metallick nature, that is, they are verily
‘eſtimated according to the nature of the (known)
‘Metals, but notwithſtanding they do not altogether
‘agree with it; that from hence I conjecture that there

'remains a great number of Metals undiſcovered. For 'every Mineral may be rightly known and diſcerned, if 'it be tried or teſted, by a juſt proof or examination. 'And to this purpoſe *Georgius Agricola* tells us, That 'he would ſhew them a certain kind of Mineral, which 'was in the number of the Metals, but (as it ſeemed 'to him) unknown to the Ancients, which the *Germans* called *Biſmuth*. And thereupon they reply, 'Therefore according to thy opinion, there are more 'then the vulgarly and commonly known ſeven Metals. To which he replies: I judge there are more, 'for this which even now I told you our Countreymen call *Biſmuth*, you cannot rightly ſay it is either 'white Lead (that is Tin) nor black Lead (that is, 'that Lead which is commonly called ſo) but differs 'from them both, and is a third kind. And again he 'tells us; That there are ſaid to be ſix Metals in number, diſtinct in kind, to wit, Gold, Silver, Iron, Copper, Lead, Tin; but that indeed and truth there 'are more. And that alſo Quickſilver is a Metal, and 'that which the *Germans* call *Biſmuth*. Therefore (he 'ſaith) that *Ammonius* had written well, that there 'are many ſpecies of Metals to us unknown.

Berman. p. 692, 693.

De natur. Foſſ. l. 2. p. 575.

CHAP. VI.

Of the ſigns and diſcovery of Mines and Ores, both in general and in particular.

NOw we ſhall relate the ſigns of Mines and Ores, as we could promiſcuouſly gather them from the beſt Authors we have, or could meet withal; and add ſome few of our own experience and obſervation. And firſt take theſe from *Cæſius*, who tells us thus: That they are either found forth by chance, or by Art and ſearch. Minerol. l. 1. c. 7 p. 123. &c.

1. ‘Sometimes Mines are found forth, without the ‘induſtry of men; as when torrents and great floods ‘do make them bare, as hapned at the Silver Mines at ‘*Friberg*.

2. ‘By eradicating the Trees that grew over the veins of the Ore, by the force of winds.

3. ‘By the falling out of ſtones forth of the Moun‘tains, by the force of large Showers, Earthquakes, ‘Thunderbolt and Lightning, the rowling down of ‘Snow, or the force of winds.

4. ‘By plowing, or accidental digging; as Gold ‘was found in *Galecia*, as *Juſtin* reporteth.

5. ‘By the burning of Woods, as hapned in *Spain*, ‘in ſhewing Silver Mines, as *Diodorus Siculus* ‘writeth.

6. ‘Laſtly, Any other force may diſcover Ores, ‘as the hoof of a Horſe (as it is ſaid) at *Goſe*‘*laria*.

Again, they may be diſcovered by Art, and probable ſigns before digging, or ſearching.

1. The heads of Springs and Fountains are to be carefully obſerved, and their Waters to be tried, becauſe they cannot be far from the Vein, as having their riſe or paſſage near them.

2. The pieces or fragments of Veins are to be marked, that the force of torrents hath laid open; for if they be ſmooth, it is a ſign that the Vein is far off, but if fixed in the Earth, or rough, it is a ſign that the Vein is near at hand.

3. The ſite and poſition of the place is to be noted, for that may be the cauſe that the Veins are more or leſs hidden in the Earth, and the pieces thruſt farther off.

4. The Froſts ſticking to the Graſs are to be marked, which commonly are white and hoary, except they which grow over the Veins of Minerals, becauſe they breath forth hot and drie ſteams, which hinder the concretion of the Froſt; therefore where the Graſs is moiſt, and not congealed with the Froſt, as other Graſs near the ſame place is, there the Vein is probably under it, and the Graſs ſhort, and of a languid and pale colour.

5. The ſigns of hidden Veins, are the leaves of Trees, which in the Spring time are livid and ſomething blewiſh, the boughs (eſpecially the higheſt) infected with blackneſs, or ſome leſs unnatural colour, and the ſtock or trunck chinked, all cauſed by metalline vapours.

6. The tops of Mountains which tend towards the South, and their bottoms towards the North, do afford an Argument of Metals, and eſpecially of ſilver,

and thoſe moſt abounding which tend directly from the Eaſt towards the North.

7. The colour of the Mountains, Stones, and Earth, is to be regarded, for theſe do not onely diſcover Metals, but alſo ſhew of what ſort they are, as a green colour Copper, a black Silver or Gold, a Purple a Fire-ſtone, or Marchaſite, livid and wan Lead and Iron, lurid or very pale Vitriol, Copperas, or ſuch like Juices, aſhie and obſcure Sulphur.

8. The ſmell or odour alſo may be reckoned amongſt the ſigns of Mines or Ores; as when two ſtones of the ſame Mountain are rubbed hard together, if there be Metal, they will greatly ſmell of Brimſtone.

9. Barren Mountains are alſo a ſign of Metals, becauſe the humour is waſted within, and the evil vapours deſtroy the young Plants and Graſs.

10. The ſtones or earth being heavier then ordinary; are a certain ſign of Metals.

11. If the ſtones ſhine more then ordinary, or be very ſolid ſhining but little, it is a ſign of Metals. And if thou flux or melt the ſtones, thou ſhalt not onely diſcover the Metal, but the kind, and quantity of it.

Vid. Agric.l.1, de re Metal. p 25, 26. Card. de Subt. l.5.p.158.

12. The Waters afford ſigns, for if they have any ſtrange ſmell, or colour, they ſhew ſome Metal. The mud and ſand in the bottom of Rivers and Brooks, are diligently to be examined; for ſomething in the length of time muſt needs be waſhed from the Veins in their paſſage. And where there are unuſual and ſtrange Plants, where they do not thrive, but their truncks are little, leaves and branches withered, *&c.* are ſometimes ſigns of Metals.

Rer. Natur. l.9.p.112.

To theſe we may add what *Paracelſus* ſaith, 'That 'coruſcation, or ſcintillation, is a certain ſign of Me- 'tals that are unripe, and yet in *primo ente*; and ac- 'cording as ſparkling or fire is carried, ſo the Veins lie. 'And that this coruſcation, or ſparkling of fire, is to be 'ſeen in the night, as if Gun-powder were ſprinkled 'in a long line, and then fired; ſo it goeth along, 'and ſhineth, and doth gliſſen, and glimmer even as 'Gold or Silver upon the Teſt or Cupel, when the 'Lead is ſeparated from it. And if this glimmering 'ſhew whitiſh, it is a ſign of white Metals, as Tin, 'Lead, Silver, *&c.* if red, a ſign of red Metals, as 'Copper, and Iron; if yellow, yellow Metals, as 'Gold, *&c.* That this coruſcation being thin and 'ſubtile, is the beſt ſign; and ſheweth ſubtile, and 'excellent Metals; and the contrary denoteth the con- 'trary. And as long as theſe glimmerings appear, 'whether of this or that colour, little or great, ſo long 'the Metal is immature, and as yet in *primo ente*, as 'the ſperm of a man in the matrix of the woman. But '*Baſilius* ſaith, Seeing this ſtuff which this coruſcation 'ſeizeth on, is found often in a place where no Metals 'are, therefore it is very deceitful; however com- 'monly, and for the moſt part of a metalline 'breath.

Laſt Will and Teſt. c. 17. p.38.

For the ſigns of Metals, in or after digging, to ſeek them, take theſe:

1. If the Miners happen into a fat clayiſh earth, 'which diſcovereth a Vein of pure and freſh Metal, it 'is a very good ſign, certainly ſhewing, that the Me- 'tal of which it is a Vein, is not far off.

2. If the earth digged up have no Metal in it, but 'be very fat, and be of a white, black, yellow, red,

green, or a bright blue or Azure colour, it is alſo a good ſign of ſome noble Metal there. For the Minemen have eſpecially a regard unto noble, neat, and prime-colours, as green Earth, or *Chryſocolla, viride æris, Lazure, Cinnabar, Sandaraca,* red *Arſnick, Auripigment, Litharge* of Gold or Silver, &c. For every one of theſe doth for the moſt part ſhew its peculiar Metal and Mineral. So *viride æris, Chryſocolla,* Green Earth, do for the moſt part ſhew Copper, or a cupreous Metal. So *Lazure,* or white *Arſnick,* or *Litharge* of ſilver, do for the moſt part ſhew the Metal of Copper. So *Cinnabar* and *Sandaraca,* or red *Arſnick,* do ſometimes denote Gold, or Silver, or both mixt together. So *Auripigment,* red *Sulphur,* or *Litharge* of Gold, for the moſt part do portend Gold. So where *Chryſocrlla* with *Lazure,* or *Lazure* with *Chryſocolla* and *Auripigment,* are found mixed and confounded together, for the moſt part they ſhew a moſt excellent and rich Mineral. Where ſtones or earth are found of an Iron-like colour they certainly ſhew an Iron mineral.

3. ‘It is to be noted, that ſometimes the *Archæus* of the Earth doth thruſt out, or vomit forth, by ſome hidden paſſages, from the lower Earth, ſome Metal; and that is a good ſign that the Miners ſhould proceed, becauſe there is certain hope of a noble metal hid there.

4. Moreover, If thin leaves of metals like to Talck do ſtick to the pebles, or ſtones, it is a good and certain ſign. Thus far *Paracelſus.* Rer.Natur. l.9.p.111,112.

Now we ſhall ſhew the ſigns from that laborious and experienced perſon, *Georgius Agricola,* which are theſe, very well worth noting. De re metal. l.5. p.76.

1. There is often found pure Gold, Silver, Copper, and Argent vive; ſeldom Iron, or *Plumbum Cinereum*, or *Biſmuth*, ſeldom ever Tin, or Lead. But the little black Stones, and the reſt, do not much differ from pure Tin, which is melted by blaſt forth of them; and the beſt *lapis plumbarius*, or Lead Ore, from which the Lead is melted, differs little from the Metal it ſelf.

2. ‘Then after pure gold, that is, *ſtatim ſuum*, that which is called rude, or unwrought; whether it be greeniſh yellow, or yellow, or purple, or black, or red without, and inwardly of a golden colour, it is to be reckoned as a rich Vein, becauſe the gold doth exceed the ſtone, or earth in weight. Alſo every Vein of Gold, whereof an 100 pound weight doth contain more then three ounces of Gold, is rich. All the reſt of the Veins of gold are to be eſteemed as poor ones.

3. Earth, whether drie or moiſt, ſometimes contains gold; but in that which is drie, for the moſt part there is more, if in the Furnace it give any good ſign, or do not want little ſpangles like cat-ſilver. Theſe Juices for the moſt part contain Gold; *cæruleum*, or a kind of blue Sand, Azure, Chryſocolla, native Borax, or green Earth, Auripigment native, yellow Arſnick, Orpiment, or Orpine, Sandaraca native, red Arſnick. Alſo pure or unwrought gold doth ſometimes ſtick or cleave, ſometimes leſs, ſometimes more in the ſand, gravel, or grittle of flints, little pebles, ſlates, or cleaving ſtones and marble. In Fire-ſtones ſometimes it is found, but very rarely.

4. ‘But the richneſs of a ſilver Vein is thus diſcerned;

‘ned; If in 100 *l.* weight of the Ore, there be above ‘3 *l.* weight, it is rich, ‘otherwiſe it is poor, as ‘is that which conſiſts of unwrought ſilver. Whether ‘the colour be leaden, red, white, black, aſh-coloured, ‘purple, yellow, liver-coloured, or of any other ‘ſort; ſuch alſo ſometimes is the Vein of flint, ‘ſlate, and marble, if much do adhere unto them. Sometimes ‘in Fire-ſtones, Cadmia, Ore of Braſs, Lead ‘Ore, and Ore of Antimony.

5. ‘But in the other ſort of Metals, though their ‘Veins may be rich, yet unleſs they be plentiful alſo, ‘they are ſeldom worth labour. But if it happen that ‘any kind of gems or precious ſtones be diſcovered, ‘they are diligently to be ſought after; as Cements, ‘Marbles, *Lapis Hæmatites*, Load-ſtone, which is uſually ‘found in the Iron mines; *Smiris*, or as commonly ‘called by Mechanicks Emery, in Silver mines; ‘the *Lapis Judaicus*, Trochites, and the like, in Quarries, ‘or elſewhere. Neither ought they to neglect ‘the ſeveral ſorts of Earth, whether found in the gold, ‘Silver, Copper Mines, or others: nor ſhould they ‘neglect the ſeveral concrete, or hardned Juices, ‘found in the metallick paſſages, or in their proper ‘Mines.

6. ‘If a yellow Earth offer it ſelf, in which the raments ‘or ſhavings of any Metal, pure or unwrought, ‘do appear, it is a good ſign: For the Metallick matter ‘from whence the ſhavings are ſeparated, muſt ‘needs be at hand. But if it offer it ſelf void of all ‘Metallick matter, but be fat, and of a white, green, ‘blewiſh, or ſuch like colour, the Workmen ought ‘not to give over, ſo they have the ſigns ſpoken of ‘before.

7. But if any drie Earth offer it ſelf to the Miner, which containeth pure and unwrought in it ſelf, it is a good ſign. If yellow, red, or black, or any other notable colour, which hath no Metal in it, then it is no bad ſign, and *Chryſocolla*, *Cæruleum*, *Ærugo*, *Auripigmentum*, *Sandaraca* being found, are good ſigns.

8. ‘Alſo where a ſubterranean Spring caſteth forth ſome piece of a Metal, we ought to purſue it; for it ſheweth that that piece was ſeparated from ſome greater part of the Metal. Likewiſe when very thin ſpangles of ſome Metal do cleave to the Rock or Stone, they are to be numbred among the good ſigns. Furthermore, Veins which forthwith do conſiſt partly of flints, partly of clayiſh and dry earth; if being mixed together with fibres, and deſcend low into the earth, it is good hope that there is metal. But if the fibres afterwards appear not, and little or no metallick matter offer it ſelf, they ought not to give over digging.

Vid. Achan. Kirch, Mund. ſubter. tom. 2. l. 10. p. 180.

9. ‘But if a brown, black, horn-like, liver-coloured flint appear, for the moſt part it is a good ſign; but white is ſometimes good, ſometimes not; but the ſand or grittle of marble, appearing in the depth of the Vein, is not good. And thoſe ſorts of ſtones that do eaſily melt in the fire, although they be tranſparent, are to be numbred amongſt the middle ſigns, if other good ſigns appear, they are good; if not, they are no good ſigns. And they are of ſome hope which above and below (or at the covering or bottom) have a flint or marble, and in the midſt clayiſh earth, &c. In like manner, where the top (or as our Miners call it, Cooping) and the bottom have

‘an Iron-like earth, and in the midſt fat and clammy
‘earth. So where the top and the bottom have that
‘which the Miners call *Armaturam* (the harneſs or
‘arming) and in the midſt black earth, or like to burnt
‘earth, theſe yield ſome hope.

10. But the proper ſign of Gold, is *Auripigment*,
‘natural yellow *Orpiment*, or *Orpin*. Of Silver, *Plumbum*
‘*Cinereum*, *Biſmuth*, and *Antimony*: of *Copper*,
‘natural *Verdegreaſe*, pared off from braſs ſtones, out
‘of which it groweth; *Melanteria*, or black Earth;
‘*Sory*, a poiſonous black pory Earth; *Chalcitis*, the
‘Copper ſtone, or red Vitriol; *Miſy*, a kind of Vitriol
‘now not known; *Atramentum ſutorium*, green
‘Vitriol, Shoo-makers black. Of Tin, the pure black
‘ſtones, out of which the Metal is melted, and things
‘digged up like the ſpume or froth of ſilver. Of Iron,
‘*Ferrugo*, Iron ſtone. The common ſign of Gold
‘and Copper, is *Chryſocolla*, green Earth, or native
‘Borax, *Cæruleum*, *Azure*, or blue ſand. Of Silver
‘and Lead, *Plumbago Foſſilis*, Lead Ore, in which
‘is always ſilver, leſs or more; and is alſo called *Galena*,
‘*Molybdena*, and *Lapis plumbarius*. But although
‘the Miners do rightly call *Plumbum cinereum* Biſmuth,
‘Wiſmuth, or Counterfein, the cover (or cooping)
‘of Silver; and that the Copper fire-ſtone, or
‘*pyrites æroſus* be the common parent of *Atramentum*
‘*ſutorium*, *Melanteria*, and the like: Yet notwithſtanding
‘ſometimes theſe have their proper metals;
‘as alſo *Auripigment* and *Stibium*. And amongſt good
‘ſigns are ſlate ſtones of a pale-blue, or black colour;
‘and alſo Lime-ſtones of any colour. But a good ſign
‘of Silver, are little black pebles, forth of which Tin
‘is drawn, eſpecially when the intervein is made of

‘ ſuch like. And thus far this noble Authour.

The ſigns to diſcover where Metals are that the expert Miners have informed me of, and that I have obſerved in theſe Northern parts, where the Ores that they either get or look for, are commonly Lead, and but rarely any Silver Ore, are theſe.

1. The Hills and Mountains from whence they are digged, are for the moſt part barren and ſqualid, having but little Graſs, and that ſhort, dried, and (as it were) withered; few Trees, Plants, or Shrubs, growing upon them; and thoſe they have, little, dwarfiſh, livid, and ill-coloured, very rocky and ſtony at the tops, with earths of ſundry colours, but moſt commonly ſomething reddiſh.

2. The ſtones that by the Land-flouds and Torrents are brought down into the Vallies, are very ponderous, flinty, grayiſh, or horn-coloured, and oftentimes pieces and fragments of *Cauk*, and pure white, and other coloured *Sparr*; and good ſtore of ſmall grey, black and white *Silices*, or pebles, which are found to be good, and for the moſt part certain ſigns that there is metalline Ore in thoſe Hills or Mountains.

3. There are commonly found upon the tops of the Hills where they find Lead Ore, many ſorts of fire-ſtones, or *pyritæ*; which rubbed hard or ſmitten together forcibly, do not onely give ſparks of fire, but ſmell moſt ſtrongly of Brimſtone, whether they yield fire or not. And ſometimes ſtore of little yellowiſh and reddiſh ſtones, and theſe prove very good ſigns of Metals.

4. Sometimes there is found fragments of very bright and ſhining marchaſites of a golden colour, or like Copper in ſhew, wrought forth of the Hills by

Rains, and Flouds, that together with ſome other ſigns named before, give great incouragement to Miners, and ſeldom deceive them.

5. Some expert Workmen (which I my ſelf have divers times ſeriouſly marked, and ſought for) have found in the chinks and holes of the ſtones waſhed from the tops or ſides of Mountains; a blue kind of Sand or Earth, being (as I conjecture) the native *Cæruleum* or Azure; as alſo a pure green Earth or Sand, which might be the natural *ærugo* or *verdegreaſe* that *Agricola* mentions: and where theſe were found they always proved good ſigns.

6. But the moſt certain ſign that all our Miners relie upon, is to find ſome fragments of Ore waſhed down from the ſides of the Hills; or by careful walking over the tops of the Mountains (whoſe barrenneſs, and ſome other ſuch like ſigns, have moved them to ſearch) and prying into the clifts, irruptions, or creviſes of the Rocks. And this they find never to fail them.

7. After they have digged, the moſt of the ſigns that doth encourage them, is grey or blewiſh ſtones, flints, or ſlates, red or yellow clay or earth, or that which appears of many colours; but eſpecially to find ſome pieces of ſuch Ore as they call looſe and ſhaken Ore; or ſome ſmall twigs of a Vein of Ore, for then they think that there cannot but be greater ſtore, if they can find the right way to it.

8. I have ſpecially noted that near where Metals are (eſpecially near *Brunghill* Moor, where Silver Ore was formerly gotten, and at a place called the *Syks*) there the Stones being for the moſt part of a greyiſh, or blewiſh colour, are very thick interſperſed with

the ſmall Atoms, or grains of Metal, as little as ſmall Pin heads, or almoſt Needle points, and will exceedingly ſhine and gliſter upon a Sun-ſhine day, and alſo are very ponderous.

Now to conclude this Chapter, I ſhall onely mind the Reader of a remarkable paſſage of *Paracelſus*; which though twice repeated in his Works, and (as I judge) of great weight, and full of honeſt and plain inſtruction to a Mineraliſt, yet hath been little regarded by any one that ever I yet converſed withal; which is this:

Cœl. Philoſ. p.126.

Id. de contract. Tract.2 p.119.

‘Whoſoever therefore doth ſearch after Minerals, it is fit that he be endowed with ſuch reaſon and diſcretion, that he have not a regard alone to vulgar and known Metals, which are found only in the depths of Mountains. For very often ſuch a Mineral is found in the very ſuperficies of the earth, that no ſuch, or none ſo good is found in the hidden deeps. Therefore every ſtone that comes into our view, whether it be great or little, whether it be a ſmall peble, or a whole ſtone, is moſt diligently to be looked into, and to weigh the nature and property of it, with an exact examination. For many times a vile flint or peble, contemn'd and thrown away, is better then any Cow. For here the dominion of Heaven prevails. And all over earth, duſt, or ſand is offered, which hath with it much of Gold, or Silver, which thou ſhalt mark and take notice of.

It may be perhaps here expected that I ſhould ſay ſomthing of the *Virgula divinatoria*, as by many judged to be a ſure way to diſcover where the Ores of Metals lie; of which I find that ſome of our credulous Miners have a great opinion, but none of them that ever I could meet withal, had made any certain or exact trial of, ſo as to verifie the truth of the experiment. Neither indeed is it much uſed by any in theſe Northern parts. But yet notwithſtanding I ſhall give you the opinion of ſome of the beſt Authors, both againſt the certainty of it, and for the verity of the Experiment.

1. And firſt *Agricola*, a very ſober perſon, far from ſuperſtition, and doubtleſs that had ſeen the fallacioufneſs of it, and that it hapned to ſhew where Metals lay but rarely; and after a long diſcourſe about the verity or falſhood of it (to whom I refer my Reader) doth conclude againſt charms and incantations uſed about it, but that the natural uſe of it may be allowed, in theſe words: ‘*Virgula igitur, in invenien*‘*dis venis, viro bono, gravique uſui eſſe poteſt.* There‘fore the rod for diſcovering of Veins of Metals, may ‘be uſed by a good and grave man. But not in chu‘ſing the figure, nor uſing charms: *non enim valet* ‘*virgulæ figura, ſed incantamenta carminum.* For ‘the figure, of the rod prevails not, but the charms.

De re metal. l.2.p.26,27,28

2. The ſecond I ſhall name, is *Paracelſus*, one whom his enemies would brand with moſt groſs ſuperſtition, and favouring or practiſing of unlawful and cheating Magick: as commonly all that pretended Magick that is practiſed, and counted Diabolical, is but the cheats of crafty and cunning Knaves; or as *Cardan* ſaid, *Carnales Dæmones, ipſis dæmonibus callidiores.* Incarnate Devils, more cunning then the Devil himſelf. He (I ſay) doth ſo clearly, plainly and honeſtly diſclaim all ſuperſtition, charms, and inchantments, as none can do more; and alſo confeſſeth the deceitfulneſs of the uſe of this Divinatory rod, in

De ſignat.rer. l.9.p.112.

theſe words; which for brevity I give in *Engliſh*. ‘Therefore care is ſeduloufly to be taken, that ye ſuffer not your ſelves to be ſeduced by the Divinations ‘of uncertain Arts. For they are vain and frivolous, ‘eſpecially the Divinatory rods, which have deceived ‘many Miners. For if they once ſhew any thing ‘rightly, they on the contrary deceive ten times. In ‘like manner, we are not at all to truſt to other fraudulent ſigns of the Devil, which are done and appear ‘againſt Nature upon the night, and at inconvenient ‘time, as Apparitions, Viſions, and the like. And in another place he ſaith; For the Divinatory rod is fallacious; as alſo the other Viſions in Glaſſes, and Cryſtals.

Philoſ. Occult. p 490.

3. The great *Kircherus* doth reject it, and that upon his own trial, in theſe words: *Certe ego ſæpius ‘hujus rei ſupra metallica corpora auri & argenti, experimentum ſumens, ſemper ſpe mea fruſtratus ſum.* ‘Certainly I very oft making an experiment of this ‘thing upon the metallick bodies of Gold and Silver, ‘was always fruſtrated of my hope. And concludeth, ‘*Atque luculenter adverti manifeſtam eſſe non dæmonis, ‘ſed virgam tractantis illuſionem.* But I have clearly ‘obſerved, that the manifeſt illuſion is not of the De‘vil, but of him that handleth the rod. From whence obſerve,

Mund. Subter. Tom. 2. l. 10. Sect. 2. p. 180.

1. That there have been, and are many things that are performed by true natural means, though hid, and ſecret; as alſo by ſleight, nimbleneſs, and cunning, that wiſer heads, and cunninger wits, have uſed charms, ſpells, ſtrange words, or incantations to, thereby to keep them veiled from the Vulgar, and to deceive others. Which hath occaſioned many inconveniences, and therefore not to be uſed by an honeſt

and conſcientious Chriſtian; but we are carefully to mark what is natural Magick, which is both lawful and laudable, what may be done by Art, which is often ſtrange and wonderful, and what is done by Diabolical means, if it be a truth that there is any ſuch matter; of which the moſt learned do not cauſeleſly doubt.

Vid. Rog. Bac. de mir. pot. art. & natur.

2. That in trying ſuch nice experiments as this, there had need be extraordinary care, and caution, both in time, and in every minute circumſtance thereof; and though one ſhould often miſs about it, it is not ſafe to conclude generally, and negatively: for an experiment (eſpecially when it depends upon Nature more then Art) may fail at ſome times and places, for peculiar reaſons; and yet when all circumſtances neceſſary and ſuitable are added, may prove effectual: and therefore notwithſtanding the authority of *Paracelſus* and *Agricola*, it may be doubted, whether their trials were accompanied with all the exact circumſtances that were requiſite for ſuch a matter, for we know they were men, and might err; and it is too manifeſt, that in many things they did err, and it is the common frailty, that no man, as meer man, hath been priviledged from.

3. For *Kirchers* trials often made with the rod upon the metallick bodies of gold and ſilver, which I ſuppoſe were the Ores of thoſe Metals, he doth not mention of what kind of wood his rod was; or whether he had tried with rods of all thoſe ſeveral woods that he nameth; which if not, he left it ſhort, and concludes not ſafely. Again, the great queſtion is, whether if the rod will move when it is over the veins of Metals, that it will do ſo at any diſtance, which is not

probable to be ſuppoſed, for the Loadſtone will no work beyond the ſphere of its activity, and therefore there may be great ſtore of Metals in the Mountain where it is uſed; and yet they not lying near enough the ſuperficies of the earth, may fruſtrate its effects, though if they had been within the compaſs of its virtue, it may be that it would have ſhewed them. Further the great *Quary* may be, that it will diſcover Mines at ſome times and degrees of their concoction, when they ſend forth ſtrong ſteams, but not when they ſend forth little or none. And much may be in the manner and skill of uſing the rod.

A diſcovery of ſubterranean treaſure, p. 11. 12.

1. Now firſt for thoſe that affirm the experiment of the rod to be true, I ſhall give what Mr. ***Gabriel Platte*** delivereth us upon his own trial, who ſaith: 'The 'operation with the ***Virgula Divina***, is thus to be per'formed: ſome obſerve a ſet day and hour, with cer'tain words and ceremonies at the cutting up of the 'ſame, which I have found to be little to the pur'poſe. Thus I wrought about Midſummer in a calm 'morning, I cut up a rod of Haſel, all of the ſame 'Springs growth, almoſt a yard long; then I tied it 'to my ſtaff, in the middle with a ſtrong thred, ſo 'that it did hang even, like the beam of a ballance: 'thus I carried it up and down the Mountains where 'Lead grew, and before Noon it guided me to the 'orifice of a Lead Mine, which I tried, having one 'with me with an hack of Iron and a Spade, and with'in two hours we found a vein of Lead Ore, within 'leſs then a foot of the Graſs. The ſigns that it ſhew'eth, is to bow down the root end towards the Earth, 'as though it would grow there, near unto the orifice 'of a Mine. When you ſee it do ſo, you muſt carry it

‘ round about the place, to ſee that it turneth in the ‘ ſtring ſtill to the place, on which ſide ſoever you ſtand. The like Story to this I have ſeen in an unnamed Author, but ſhall here omit it, becauſe I know not of what credit he was.

2. The ſecond I ſhall give you is, from the Author of the *Nova diſquiſitio de Helia artiſta*; who affirms it of his own knowledge thus, which I give you in *Engliſh*. ‘ Let a two-forked rod be cut of one years ‘ growth, of Haſel or of Oak, whoſe Forks or two ‘ twigs muſt be equal, and without fault. Some think ‘ it ought to be cut down before the Sun riſe, eſpecial‘ ly the Moon increaſing, and that above all about the ‘ day of the *Annunciation of Mary*. But we obſerved ‘ none of theſe. This being done, let the two ends be ‘ taken into the oppoſite hands, the fingers compreſſed ‘ upwards towards Heaven; to wit, that on both ‘ ſides the ends of the twigs of the divided branch, ‘ or fork, may hang forth out of the hands at both the ‘ thumbs preſſed to the hands. But the root of the ‘ forked branch muſt bend outwardly between the two ‘ hands. Which if any having ſilver buttons fixt to ‘ his doublet, that cut end of the root, although with ‘ all thine endeavour thou compreſs the rod in both ‘ hands, will make a circle by moving by it ſelf, and ‘ will turn it ſelf inwardly towards thy doublet, even ‘ to the buttons. But if, having no Metal at all about ‘ thee, thou lay ſilver or gold upon the earth; then ‘ holding it faſt, and being unwilling, the cut part of ‘ the root will bend outwardly, until with a ſtrong ‘ motion it ſmite the Metal. That there are many exceptions may be made againſt theſe two experiments, is plain; but I ſhall omit them, becauſe thoſe

Theatr. Chym. Vol. 4. p. 171.

that are curious may eaſily be ſatisfied with trials of this nature.

Laſt Will and Teſt, c. 23.

3. *Baſilius Valentinus* hath a large diſcourſe about ſeveral kinds of rods, but I confeſs to me ſo dark, that I dare not adventure to meddle with them, nor to ſay that I underſtand any thing of them, onely I ſhall give you theſe two paſſages. Firſt he ſaith; 'Though 'the ſtirring of the rod is fallen into abuſe among ma-'ny people; however it is a fundamental way to know, 'and to bring forth the Metals, if duely and naturally 'uſed. Again, he ſaith: Therefore if you take ſuch 'a rod, eſpecially of a Haſel, or of a Kray Tree whoſe 'ſap is full, and beareth a pleaſant and ſweet fruit; it 'draweth the ſame downwards, that the rod muſt 'ſink and ſtick; it will ſuck out the juice when the 'rod ſtands right on its paſſage, this holdeth from a-'bove unto this ſtation, where the rod ſtands ſtill, that 'place they call the Ores ſtation, ſtanding as ſtreight 'as a line. I ſhall ſay nothing, but refer all to experiment; for ſome have believed too much, and ſome too little.

CHAP.

Chap. VII.

Of thoſe Minerals that are ſaid to be of affinity to Metals, as thoſe they call Cachimiæ, Marchaſites, Pyritæ, or Fire-ſtones.

WE ſhall ſpeak ſomething of theſe, becauſe the difference, and divers kinds of them are little known or regarded by our common Miners, becauſe they can make no profit of them, nor other uſe, except as ſigns to diſcover where metalline Ores are. And what is convenient to our purpoſe we ſhall give you, what we account material forth of ſome choice Authors, and alſo what we have noted and obſerved our ſelves.

1. And firſt of thoſe they call *Cachimiæ* or *Kakimiæ*, for it is printed both ways; but whether the word be Arabick (as moſt judge) I being not at all skilled in that language, or of ſome other tongue, I cannot certainly determine. For I find nothing either written by *Toxites*, *Rulandus*, or our Countryman *Johnſon*, but what they ſeem to have taken forth of *Paracelſus*, but have either groſly miſtaken, or wilfully perverted the ſenſe of that learned and experienced Author; for they make a *Kachimia* to be *Immatura metalli minera, vel ſemiperfectum metallum, & nondum à natura abſolutum, quod adhuc in primo ſuo ente, ut infans in utero ſuæ matris deliteſcit. Ejuſmodi Kachimiarum ſpecies triginta reperiuntur hactenus cognitæ.* It is the immature Ore of a Metal, or an half-perfect Metal, and not yet compleated of Nature; which as yet lieth hid

Tox Onom.
a. p 447.
Ruland. Lex.
Alchym.
p 270.
Johnſon Lex.
Chym. p. 117.

hid in its firſt being, as an Infant in the womb of the mother. And that there are thirty ſorts of theſe *Kachimies* found that are known. This is indeed the deſcription of his *primum ens* of Metals, or of the volatile ſpirit of Metals, whileſt it lies hid in *Kachimies*, *Marchaſites*, and the like, as a child in the womb of the Mother, but not of a *Kachimy*, as we ſhall ſhew hereafter. And he doth not ſay that there are thirty ſorts of them, but that of *Marchaſites* and *Kachimies* there are about thirty ſorts comprehended under thoſe two names, not under the one of them. But his deſcription is thus, both of a *Marchaſite* and a *Kachimie*; for ſpeaking of *Marchaſites*, he ſaith; *Nihil autem* ‘*ſunt aliud, quam ſuperfluitas metallorum, hoc eſt materia,* ‘*in metallis abundans, quam metalla intra ſe ferre,* ‘*ac continere, aut in ſuam formam vertere nequeunt.* But *Marchaſites* are no other thing then the ‘ſuperfluity of Metals; that is to ſay, a matter abounding in Metals, which the Metals cannot bear, or ‘contain within themſelves, or change into their own form. And that a *Kachimy* is of the ſame ſort, to wit, bred of the ſuperfluity of the Metals, he thus declareth: ‘*Sic ergo Marchaſita nihil eſt aliud, quam ſuperfluitas* ‘*abundans in prima materia metallorum in Ares, quæ* ‘*per Archæum ſeparatur in Yliadum, unde poſtea Marchaſitæ, & Kachimiæ generantur triginta circiter generum & formarum, quæ tamen omnia duobus iſtis nominibus comprehenduntur. Quod vero illæ multiplices ſunt, nec unius formæ, licet ab una materia deſcendant, cauſa eſt hæc, quia ſcilicet inæqualiter concurrit* ‘*trium primorum pondus, uno altero abundantius ſeſe* ‘*conferente. Hinc formas enaſci varias neceſſe eſt.* ‘So therefore a Marchaſite is nothing elſe, then the ſuper-

Lib de Elem. Aq. Tract. 3. de Miner. p. 280,281.

Vid Schrod. Pharm. l. 3. num. 5. p. 124.

‘ſuperfluity abounding in the firſt matter of Metals in the Ares, which is ſeparated by the Archæus into the Yliad; from whence afterwards *Marchaſites* and *Cachimies* are generated about thirty of divers ſorts and forms; which notwithſtanding are all comprehended under theſe two names. But, that they are manifold, and not of one form, although they deſcend from one matter, the cauſe is this, becauſe the weight of the three firſt principles do meet together unequally, one beſtowing it ſelf more abundantly then another. From hence of neceſſity divers forms do ariſe. From hence it is plain that *Cachimies* and *Marchaſites* are bred and generated of the ſame matter; to wit, the ſuperfluity of the Metals; and are both about thirty in number, of divers forms and colours. And for the difference betwixt them he makes it this: ‘*Eſt autem Cachimia fixior, & conſtantior Marcaſita, propter ſal fixum ex quo conſtat.* ‘But a *Cachimy* is more fixed and conſtant then a *Marchaſite*, becauſe of the fixed ſalt, of which it conſiſts.

Ibid. p. 230.

Again, he enumerateth eight ſorts of *Cachimies* that were known unto him; to wit, *Marchaſitæ* Marchaſites, *Pyrites* Fire-ſtones, *Antimonia* Antimony, *Cobalta* Cobalts, *Talka* Talks, *Auripigmenta* Auripigments, *Sulphura* Sulphurs, *Arſenicalia* Arſnicks. Now it ſeems he maketh both *Cachimies* and *Marchaſites* to be the ſuperfluity of Metals; onely that a *Cachimy* is more fixed then a *Marchaſite*; and ſo ſeemeth to make *Cachimia* the Genus to the other eight, and then every *Marchaſite* is a *Cachimy*, but not on the contrary; but how this ſhould ſtand with the rules of Logick, I underſtand not; nor that Antimony is a

Cachimie, being in ſome reſpects a Metal, or at the leaſt a ſemi-metal. But it was uſual with this Author not onely to neglect, but to deſpiſe the Art of Logick; and if he did but certainly know the ſeveral ſorts of Minerals, and their nature and properties, he little regarded the ordering of them according to thoſe ſtrict rules. Therefore I ſhou'd commend this particular to be ſeriouſly conſidered of, and due obſervation to be made thereof, that what is defective may be ſupplied, and what is amiſs may be rectified.

Muſ. Worm. l.1.Sect.2.c 3. p.39. De nat. Foſſ. l. 10. p. 658. De metal. l. 2. c.54.p.148. De re metal. l.1.c.14.p.25.

2. As for *Marchaſites* and *Pyritæ* Fire-ſtones, *Paracelſus* makes them to differ; and ſo *Wormius* ſeems to do, ſhewing that ſome of them may better be referred to the ſorts of Metallick bodies, then meerly to the kinds of ſtones. But others make them both one, as *Agricola*, *Cæſalpinus*, *Encelius*, and moſt of the reſt. And ſome think them called ſo, by reaſon of yielding forth ſparks of fire; and ſome becauſe of their ſhining and fiery colour. We may take them under theſe conſiderations. 1. Thoſe that have the ſplendour and colour of Metal, and alſo contain ſome Metals in them. 2. Thoſe that have the ſplendour and colour of Metals, and contain no Metal in them. 3. Thoſe that yield fire by ſtriking, and thoſe that yield none.

Agric de natur. Foſſil l. 10. p.658.

1. Thoſe *Marchaſites* or Fire-ſtones that contain Metal in them, are in general of divers ſorts, and colours. *Agricola* reckons theſe, that at *Reithestein* in *Lygiis* (that is within *Germany*) there were found thoſe that yielded ſilver and gold; and at *Cotteberg* in *Bohemia* thoſe that yielded copper and ſilver, and thoſe that yielded lead and tin, copper and ſilver at *Goſelac* in *Saxony*; onely copper in thoſe that are found

at *Cuperberg* in *Bohemia*, and in many other places: But that of *Breitebren* in *Miſnia*, none at all; which is alſo confirmed by *Wormius*. *Rulandus* doth number ſix ſorts that yield Metal of one ſort or another, that are very ponderous and yield ſparks of fire. 1. One of a ſilver colour, that yields ſilver. 2. One other of almoſt a golden colour, forth of which copper is melted. 3. One of a full golden colour. 4. One like the Ore of ſilver or *Galena*, that like the former, holds ſilver, and ſome gold. 5. One of an aſh-colour that holdeth gold and ſilver. 6. One of an Iron like colour, but what it holds he telleth not.

M. ſ Worm. l. 1. Sect. 2. c. 3 p. 134.
Lex Alchym. p. 394, 395, 396, &c.

2. He reckons four of a ſilver colour, that hold no metal, nor yield any fire: and ſix others of a golden colour, that have no Metal in them: And other five of a golden colour, that hold no metal, nor yield fire: And ten more of an aſh-colour, that hold no metal in them, nor yield fire.

3. He nameth four of other colours, forth of which fire is ſmitten; and ſo of divers others that do yield fire, and thoſe that do not yield fire: and numbreth ten ſeveral ſorts that are fertile of Metal; to which I do refer the Reader.

They alſo ſeem to attribute to every one of the ſix Metals its proper *Marchaſite*, but have not been ſo free to tell us which were they, nor what they in this ſenſe meant by a *Marchaſite*. For *Baſilius* ſaith; For what is the *Marchaſite* of Iron? Is it not the Magnet? what is it of gold? is it not *Lazul*? and ſo forth of the reſt. And Antimony that they call the *Marchaſite* of Lead, but for the other three, we are at a loſs, except we can make it forth from ſome paſſages in *Paracelſus*, where

Laſt Will and Teſt. c. 24. p 49.
Rer. nat. l. 8. p. 104.

he ſeemeth to grant thus much, that the *primum ens*, or ſpirit of ſilver is in a white *Marchaſite*, white *Talk*, &c. In *Zink* and *Cobalt* the ſpirit of Iron, of Copper in *Zink*, *Vitriol*, &c. In *Zink* or *Biſmuth*, &c. the ſpirit of Tin, and in *Cinnabar* the firſt *ens* of Quickſilver. But this makes but a ſlender conjecture; for if every matter, as Stones, Clays, Earths, Juices, Cauk, Sparr, Marble, Plaſter Ore, or Quarry, in which the Metals are commonly contained and mingled, be *Marchaſites*, then the Ore of every Metal is its proper *Marchaſite*. But we may as roundly ſay, that the *Lapis Lazuli* is the *Marchaſite* of Gold; of Silver, *Talk* or *Galena*; of Lead, *Antimony*; of Tin, *Biſmuth*; of Copper, *Zink*; of Iron, the *Load-ſtone*; of Quick ſilver, *Cinnabar*. But of this enough.

Now I ſhall ſay ſomething of *Marchaſites* or *Pyritæ*, of mine own experience. We have in our Coal-pits in theſe Northern parts great ſtore of the ſaid *Marchaſites*, ſome of which are of a very bright ſhining golden colour, and ſome of them of a pure bright ſilver ſplendor, and ſome of them ſo curiouſly intermixed with diverſity of colours, that are very delightful to the Eyes; theſe are ſomething ſoft and will not ſtrike fire, but being laid in a cold and moiſt place, will diſſolve; and then any one may perceive that they hold ſtore of Vitriol; but being fired in a melting pot, do yield ſtore of fumes that ſmell ſtrongly of Sulphur, by which we may be aſſured that they contain both Brimſtone and Copperas. There are alſo other ſorts found, that are ſome of them bright; and of a metalline colour, and far more hard then the former, which by ſtriking will yield ſparks of fire.

Alſo I have divers ſorts of them that are very ſmooth and ſhining, as bright as *Flanders* metal, *Orichalcum* or Braſs, which is found in the Quarries of Stone, Slate-pits, or where they get flooring-ſtones for paving of houſes, in the clifts betwixt the Stones, but contain no Metal in them, but being fired do ſmell ſtrongly of Brimſtone. Some few I have had that held ſome little Copper in them, of an hard ſubſtance, and not very bright but ponderous; but I have found none that held any Silver, Gold or any other Metal in them. Many other ſorts I have of divers and ſundry colours, ſome of a golden, ſome of a ſilver-like, and ſome of a copper-like, or braſs-like colour; ſome of them found near the Lead Ore, and ſome of them in their proper Mines, ſome of them in confuſed lumps, or interſperſed in Stones, Cauk, or Sparr; ſome triangular, ſome of them quadrangular, like to the *Ludus* of *Paracelſus* or *Helmont*; ſome ſexangular, and ſome of them of other figures; but all of them ſulphureous, and to be fired away to nothing, but an unprofitable black Earth. One ſort there is found in ſome of our Lead Mines near the Ore, that is ponderous, black, and gliſſening; but by ſeveral trials I could find no Metal in it, neither any great ſtore of ſulphureous fumes; and it is not that which the *Germans* call *Blend*, and our Miners blue *Blind akr*; becauſe that is brighter, more ſhining, and liker a metallick body. I therefore intreat all Miners to inquire of theſe particulars.

1. What ſorts of Fire-ſtones or *Marchaſites* they find, and near what ſorts of Metals.

2. Of what colours, forms, and figures, that they may get them tried, to ſee what ſort of Metals they contain; or if they hold Vitriol, Sulphur, Alom, Salt, or any other ſort of Mineral.

3. To make exact obſervation what difference there is to be found amongſt them, either as to colour, ſhape, taſte, ſmell, or any other qualities that appear in them, and if poſſibly their number.

Chap. VIII.

Of the ſeveral ſorts of Gold according to the myſtical Authors; alſo of the primum ens *of Gold, and of ſome other things of the like nature.*

NOw we ſhall come to the Metals themſelves, and firſt of thoſe that have been commonly and anciently accounted ſo; to wit, the known ſeven, and afterwards to thoſe that ſome eſteem as Metals, that have been more lately diſcovered, or at leaſt by others are acknowledged to be ſemi-metals. And firſt of that moſt noble metal of all others, Gold; of which *Paracelſus* maketh three ſorts: ſaying, *Aurum eſt in eſſentia triplex,* Gold in eſſence is threefold, 1. *Cœleſte, & eſt ſolutum,* celeſtial and looſed. 2. *Elementare,* and that is fluid. 3. *Metallicum,* and that is corporeal. I confeſs the place is very dark, and hard to underſtand; but I thought good to commend it to the curious ſearcher of Natures ſecrets; for there is more of truth in it, then at the firſt ſight any one would imagine; and that which follows will make it more plain.

Lib. Vexat. Canon. 7 p. 123.

Comp Herm. c. 18. p. 54.

Rhumelius a *German* Author of good account and experience, whoſe Works are not tranſlated that ever I could hear of, ſaith thus: ‘There is no greater ‘ſtrife amongſt the Phyſicians, then about the ſub‘ject out of which the matter of the *Elixir vitæ* is to ‘be taken and prepared. And it is found in the final ‘concluſion, that in Gold alone the medicament is to ‘be ſought and found, becauſe that Nature alone ‘doth conſiſt in the ſpirit of Gold, that drives away ‘all diſeaſes, and brings in health; and this all Philo‘ſophers with one voice confeſs. It is found alſo in ‘*Philoſophia adepta*, *& naturæ theſauro*, that in *rerum* ‘*natura* there are four ſorts of Gold. 1. *Aſtraliſh*. 2. *Mineraliſh*. 3. *Metalliſh*, 4. *Elementalliſh*.

1. *Aſtraliſh* is, and is called that very thing which as ‘yet lieth in *primo ente*, and therein is as yet imperfect. ‘*Frater Baſilius* calls it, the Star of the Sun, becauſe ‘the ſtars as yet have their influence and firſt opera‘tions therein. And from this ſpiritual-like matter ‘(ſaith he) from whence the beginnings of Gold doth ‘grow, may be made *Aurum potabile*, more perfect ‘and better, then from the perfect common gold it ‘ſelf; which firſt muſt be opened, and made ſpiri‘tual, ere forth of it drinkable gold can be prepared. ‘*Theophraſtus* calls it, *Electrum immaturum*, *& pri*‘*mam compoſitionem ſolis*, becauſe therein Nature ‘doth yet work her firſt compoſition; and it is there ‘likewiſe called *aurum immaturum*, unripe or imma‘ture gold. *Aureum Vellus* calls it, *primum ens ſolis*, ‘and *Roſarius*, gold and ſilver *in poſſe*. *Turba Philoſo*‘*phorum* calls it *leonem viridem*, the green Lion, ‘while it is yet green, crude, immature, and imper‘fect. Moreover, this matter is entituled by the ‘Mine-workers, and named with its proper Teuto‘nick or *German* name; which in this place cannot be ‘remembred without prejudice.

2. *Aurum minerale*, or Mineraliſh gold, is that ve‘ry thing, which as yet doth ſtick in its Earth-ore, or ‘*Berg-ſtuff*, until it be melted from thence, and brought ‘into a pure and clear Metal.

3. *Aurum metallicum*, or Metalliſh gold, is that ‘which being freed from its *Schleck* and raw minera‘liſh Ore-ſtuff, and with great force of fire is driven ‘forth of it, and then may be called a pure and clear ‘Metal.

4. *Aurum Elementale*, or Elementaliſh gold, is ‘any Earth, Mineral, Stone, or the like, wherein the ‘ſpirit of gold doth lie hid, and may be drawn forth ‘by the *Spagyrick* Art. And he from hence conclu‘deth that the Aſtraliſh gold, according to the expe‘rience and the teſtimony of all Philoſophers, is the ‘beſt and moſt profitable of all theſe four.

From whence we may note; 1. That Mineraliſh gold, as it lies undrawn from its Ore, Marble, Earth, Sparr, Stone, or the like; is commonly known, and eaſily to be had, there being divers ſorts of gold Ore, of ſundry ſorts to be gotten from many places.

2. That Metaliſh gold is that which is purified and refined, and is commonly known, and to be had.

3. That Elementaliſh gold, being that which lieth hid in many Earths, and Minerals, may by a laborious and skillful Chymiſt be had and obtained. As *Wormius* relateth of the *Terra ſigillata Sileſiaca*, or *Stri‘gonenſis*, which is found in the gold Mines near *Stri‘gonium*, amongſt the hard Rocks. And was firſt in‘vented by *Johannes Montanus*, a moſt famous Phy‘ſician, who publiſhed a Book of the ſame. Where‘in he ſetteth down that it is gold by the provident or‘dination of God and Nature tranſmuted into a moſt excel-

Muſ. Worm. l.1. c.4. p.13.

'excellent prepared medicament, profitable againſt 'poiſon, no leſs then the medicaments prepared with 'great charges forth of *Hungarian* Gold; and (ſaith) 'that the Chymiſts call it *Axungia Solis.* Of this alſo '*Schroderus* tells us, that that which was gotten and 'prepared at *Striga*, a Town of *Sileſia*, was called '*Medulla vel axungia Solis*, becauſe it was believed to 'be impregnated with the ſulphur of gold. And 'that Earth called *Lignicenſis*, was termed *Axungia* '*Lunæ*, becauſe it was mixed with the ſulphur of Sil'ver. And this, or ſuch like, it is probable that was 'which *Paracelſus* calleth *Axungia Solis*, which he 'preſcribeth againſt the poyſonous bite of a *Salaman'der*, uſed both inwardly and outwardly.

Pharm.l.3.c.2. num.3. p.6.

Chir. mag.c.3. p.33.

4. But the Aſtraliſh gold is the great ſecret, and therefore may be queſtioned whether it may be found in a liquid and ſoft form, or hard, or both; and of the former we ſhall ſay thus much.

1. We ſhall give the teſtimony of *Paracelſus*, and leave it to cenſure; who ſaith thus: 'The firſt *ens* 'is an imperfect compound, predeſtinated unto ſome 'certain end, and corporeal matter. And becauſe it 'is not perfect, therefore it can alter any body with 'which it is incorporated, as Mercury, which is like 'this imperfect *ens*, according to its imperfection. 'But we ſpeak of the firſt *ens*, which is perfect to re'new and reſtore the whole body, as is the firſt be'ing or *ens* of Gold; and that for this cauſe, by reaſon 'it altogether poſſeſſeth the ſpirit of gold, and is moſt 'ſubtile, and far more ſubtile then the true body of 'Gold it ſelf. Alſo from hence it cometh to paſs 'that the firſt *ens* of Sol or Gold, is penetrable, even 'as Mercury in Metals; and doth not contain in it

‘ſelf the ſpirit of Salt; by which it may be coagulated. ‘For the ſpirit of Salt the firſt coagulating *ens*, receiveth ſo great forces, that Gold for the hundred part, ‘is not ſo potent in its vertues, as the *primum ens* of it ‘is. Further, it is to be known that the firſt *ens*, that ‘is to ſay, the firſt compoſition of Gold, which as yet ‘remains a liquor not coagulated, doth renew and reſtore whatſoever it takes; not onely men, but alſo all Beaſts, Fruits, Herbs, and Trees. From hence we may note theſe things.

1. That if this Author be to be credited, then in *rerum natura* there is ſuch a thing as the *primum ens* of Gold, and this as a liquor not coagulated. To the ſearch and enquiry of which, I humbly and heartily intreat all ingenious perſons, and Sons of Art, to uſe their induſtry, and ultimate endeavour, and not to think it a *Chymical Chimæra*. For if the quotation of that honourable perſon Mr. *Boyle* (who uſeth not to cite Authors of ſmall credit or veracity) may be truſted, from *Gerardus* the Phyſick Profeſſor (a man of great learning and Chymical experience, and whoſe fidelity is not queſtioned by any) that ‘at *Anneberg* a ‘blue water was found, where ſilver was yet in *primo* ‘*ente*; which coagulated, was reduced into the calx ‘of fixt and good ſilver. Then it may be as poſſible and probable, that the liquor of Gold may likewiſe be found uncoagulated, eſpecially if we conſider that all the Adeptiſts do ſeem to acknowledge a twofold way of the generation of Gold; one when the mercurial and ſulphureous ſteams (of which Metals are bred) being pure before and at their conjunction, do meet with a pure matrix, that hath nothing of impure ſulphureous fæculency, nor other earthly or wateriſh unclean-

Scept. Chym. p. 360.

uncleanneſs to mix with them, and to pollute them, then pure Gold, and no other imperfect metal is generated: and in this way onely I conceive, that the pure *primum ens auri*, is to be had liquid, and not otherwiſe. Another way there ſeems to be of the generation of Gold, and that is when the mercurial and ſulphureous ſteams, either before, or at their conjunction, are commixt with ſome impurities, or meet with an impure matrix, or both; then this liquor being the firſt *ens* of Gold, cannot be had; but yet that impure ſubſtance containing in it the true ſeeds and principles of Gold, will in time work it ſelf through the degrees of the imperfect metals into Gold, as Nature's ultimate and finite end; and therefore in ſome reſpects (though perhaps not to be found liquid) contains in it the *primum ens auri*, which I wiſh may be noted.

For it is the unanimous conſent of all the Adeptiſts (as we have ſufficiently proved before, where we ſhewed the vegetability of Metals) that Natures intent was to bring all metals to the perfection of Gold, if ſhe had not been hindered by the advention and mixture of extraneous matter; and ſo that metals do not ſpecifically differ one from another (as *Eraſtus* and many other Authors, ignorant of, and unexperienced in the true manner and order of Natures way of producing of Metals). but onely gradually, ſome of them ſtanding in an intermediate way, and wanting the due height of concoction and maturation. For as *Petrus Bonus Ferrarienſis* ſaith, *Ad aurum reliqua metalla ordinantur tanquam ad finem*: For the ſeed of all Metals are but ſpecifically of one nature: for as *Treviſan* ſaith, Nature hath nothing in the bowels of the

Earth, whereof it may generate Metals, but onely a mercurial ſubſtance, in which is included its quickning ſulphur, as its agent. And there is Sulphur and Mercury, equally perfect in the reſt of the Metals, as well as in Gold; onely it is in the imperfect Metals infected, or contaminated with terreſtrial fæculency, or combuſtible Sulphur, which are extraneous and adventitious unto it, and not of its homogeneous and conſtitutive principles. For the Metals become more pure, or impure according to the wombs where they are produced; a pure matrix yields a pure metal; and ſo on the contrary, for Nature always aims at the moſt perfect work, though ſometimes by accident ſhe may be hindered; and perfection in the inferiour Metals is attained, when either by Nature or Art, they are brought into Gold; the one of which all experienced Miners know, the demonſtration of the other remains with the Adeptiſts. And to this purpoſe we may take ſerious notice of another paſſage in *Paracelſus*, who ſaith; '*Primo ſciendum eſt, metallum quodvis, &c.* Firſt we are to know that every Metal, as 'long as yet it lies hid in its firſt being, or *ens*, hath its 'peculiar ſtars. So Gold hath the ſtar of the Sun, Silver 'hath the ſtar of the Moon, &c. But ſo ſoon as they 'are come unto their perfection, and are coagulated 'into a fixt metallick body, their ſtars do recede from 'every one of them, and leaves its body dead. From 'whence it follows, that all their bodies are from 'thenceforth dead, and inefficacious; and the invin'cible ſtar of the Metals doth overcome them all, and 'convert them into its nature, and make them all ſo to 'be Aſtral. Whereby we may perceive that when the Ore of Lead is from its liquid and ſoft ſubſtance,

Rer. natur. l. 9. p. 113.

coagulated into an hard metallick body, then the ſtar of *Saturn* doth leave it, and ſo of the reſt; but it muſt be underſtood, that when the ſtar of an imperfect Metal hath left it hardned, that yet the ſtar of ☉ or ☽ may operate in it to a greater perfection.

I may add to this purpoſe what *Treviſan* ſaith, That vulgar bodies, to wit, Metals perfected by Nature alone in the Mines, are dead, that they cannot bring imperfect bodies to perfection. So that thereby it is granted, that before they were perfected in the Mines, they had life and vegetability. And *Baſilius* ſaith, that therefore all things are found more perfectly in the ſtar of the Sun, then in the reſt of the Metals, if it be brought to its maturity by the benefit of the fire.

De Alchym. Theat. Chym. Vol. 1. p. 754.

2. We may note, whether this *primum ens auri*, in its liquid form, be to be had or not: and that this Author doth affirm, ſaying; And although we cannot ſo well take theſe *prima entia*, as we have written; or have them in the ſame eſſence, as we have demonſtrated before; nevertheleſs that thing is notwithſtanding poſſible unto us: for if we know where a Mine of Gold lies hid, we ſhall alſo find its *primum ens* there, if we ſhall come before its perfection. And to make the thing more feaſible, he addeth the ſigns how we may know when it is in *primo ente*, ſaying:
‘So verily while it is yet in its firſt being, it maketh
‘the Trees fruitful, and the Earth fertile, it renova-
‘teth old Trees that of twenty years have brought forth
‘no fruit. For when the firſt being of Gold hath ta-
‘ken hold upon them, or their roots, they begin again
‘to live and flouriſh as before. And a little after he
‘ſaith; But where flames, or ſcintillations have been

D. Renovat. & Reſtaur. l. p. 45.

‘ ſeen; it is to be judged, and noted, that a Metal is ‘ then made *ex primo ente.* And to confirm this in another place, ſpeaking of coruſcations, or ſcintillations ſeen in the night; which he ſaith ‘ are certain ‘ ſigns of a latent Metal, that is not yet come to perfect ‘ maturity; but as yet in its firſt being. And that ‘ further it is to be known, that as long as thoſe effulgeſcences or glimmerings appear, whether great ‘ or little, whether of this or that colour; that then ‘ that Metal is not yet perfect and ripe in its Mine, but ‘ as yet is in its firſt being, no otherwiſe then the ſperm ‘ of a man in the matrix of a woman. Alſo he concludeth that Gold doth grow *ex primo ente auri*, from ‘ the firſt being of Gold, to ſuch a form from its beginning of Gold, that in touch it is like to red Water, and is moved and exalted like Gold.

Rer. nat. l. 9. p. 112.

De Renovat. p. 45.

3. And the more to illuſtrate this, we may call to mind what we have in this Chapter ſpoken of Elementaliſh Gold, that the ſteams of Gold may be had in divers Earths and Minerals; as *Paracelſus* confeſſeth, ‘ it may be drawn forth of *Marchaſites*, *Granates*, ‘ *Cachimies*, *red Talk*, *Lazure*, and the like, by the ‘ degree of ſublimation. And further ſaith: But it is ‘ to be noted of this *primum ens*, that it is a fugacious ſpirit, as yet conſiſting in volatility, as an Infant ‘ lies hid in the womb of the woman; and is ſometimes likened to liquor, ſometimes to Alcool, or ‘ Atoms.

Rer. nat. l. 8. p. 104.

And for the obtaining of this volatile ſpirit, he giveth this caution. ‘ Whoſoever therefore goeth about ‘ to get and ſeparate the *primum ens* of every ſuch like ‘ body, doth ſtand in need of much experience, and ‘ knowledge in the *Spagyrick* Science.

Ut ſupr. l. Rer. nat. p. 104.

2. We may now conſider whether this *primum ens auri* may be had in an hard and coagulated form or not. And it appeareth plainly that it may; for the Philoſophers that ſought after that great ſecret of Nature and Art, the Phyſical Tincture, or Grand Elixir, do certainly affirm it. And they, though they writ darkly, yet it was truly that there is ſuch a metallick ſubject that hath in it the ſeminal principles of Gold and Silver, in vegetability, which was the onely true ſubſtance forth of which they accompliſhed their great work, both as to tranſmutation, and the univerſal medicine. And to prove this, we ſhall quote ſome few pertinent particulars from unqueſtionable Authors. And firſt that learned Author of the *Roſary of Philoſophers*, ſaith thus, *Tale ſulphur non reperitur ſupra terram, niſi in quantum exiſtit in iſtis corporibus, ſole & luna, & in alio quidem eſt illud, quod nulli dicitur, niſi ex parte Dei ſibi reveletur.* Such a Sulphur is not found above the earth, but in as much as it exiſts in thoſe two bodies of Gold and Silver; and truly it is in another body, which is declared to no man, except God upon his part may reveal it unto him. From whence we may note, that this Sulphur they ſpeak of, is not a combuſtible Sulphur; for their maxim is, that no combuſtible matter enters their work, but that vivifying and incombuſtible ſulphur that is Natures true fire and agent, which is hid in the metallick Mercury, and is to be found moſt perfect in Gold and Silver. And that it is alſo found in another ſubject, which none will openly declare; and this is it that is ſo carefully to be ſought after. Agreeable to this is that ſaying: *Datur in rerum natura corpus metallicum quoddam, facilis ſolutionis, faciliſque*

Art. Aurifer. p. 95.

Theatr. Chym. Vol. 2. p. 1326.

‘*que putrefactionis; ſi ejus præparationem noſti, felix*
‘*medicus eris, totis conatibus, in eo votum tuum dirige.*
‘ There is a certain metallick body in the Nature of
‘ things, that is of an eaſie ſolution and putrefaction; if
‘ thou knoweſt the preparation of it, thou art an hap-
‘py Phyſician, direct thy deſire with thy whole en-
‘ deavours in this thing. *Baſilius* ſaith, having ſpoken
‘ of common Gold, Thoſe that dive deeper in this
‘ Art, will meet in the ſame place with a more eaſie
‘ and better known matter, which almoſt was named
‘ and ſet down, of an effectual quality. And after he
‘ ſaith, In this known and deſpicable matter and mi-
‘neral ſubſtance, is found a Sulphur and Tincture
‘ more effectual, and more worthy then the beſt Gold
‘ can afford which is fluid and open, and its mercurial
‘ ſpirit alſo; and its myſtical ſalt is free, and open,
‘ whoſe virtues may with leſs pains in a viſible man-
‘ ner be drawn from it. This is a very remarkable
paſſage, and worthy to be ſeriouſly weighed and
conſidered of.

Elucidar. 12. Keyes, p. 118, 119.

I ſhall onely add another Teſtimony, which is
this; *Materia noſtra non eſt mercurius quilibet, ſed*
‘*ille circa quem natura ſuas primas operationes incepit,*
‘ *& eas primas operationes determinavit ad naturam*
‘ *metallicam, ſed imperfecte rem illam reliquit. Non eſt*
‘ *res plane perfecta, nec penitus imperfecta. Sed ipſa*
‘ *eſt res media inter corpora perfecta, & imperfecta.*
‘ Our matter is not any ſort of Mercury, but that about
‘ which Nature hath begun her firſt operations, and
‘ hath determinated thoſe firſt operations unto a me-
‘ tallick nature, but hath left the ſame thing imperfect-
‘ly. It is a thing not plainly perfect, nor altogether im-
‘ perfect: But it is a middle thing, betwixt bodies that
‘ are perfect and imperfect.

Art. Aurifer. p. 112.

To theſe we ſhall add what *Rhumelius* ſaith, where he ſpeaketh of the vertues of his Medicine, which he calleth, *Aurum Vitæ.* ‘The matter forth of which it is prepared, is a pure ſhining Mineral; which in its firſt coagulation is found red, and was to be had in the Gold-mine hills of *Hungaria* and *Siebenburg*, and in the *terra rubea*, the *terra Adamita*, and the red Lion, the *Electrum immaturum*, the *primum Ens Solis*, the *Axungia Solis*, or the goldiſh *Saturn* of the Philoſophers.

Antidot. Chym. 261.

Further he ſaith, ‘I prepare mine *aurum potabile* two manner of ways; the one forth of perfect Gold, that is to ſay, common and perfect fine Gold: the other *ex auro imperfecto, vel è radice ſolis, vel primo ente ſolis*, and are both potable; and therefore may not unfitly be called *Aurum potabile.* My Tincture (he ſaith) of *Sol*, is an extraction as well forth of a Rubie-coloured, red, through-ſhining, or tranſparent, golden Ore; as alſo from ſeveral other ſorts of Metals and Minerals, wherein the Sulphur and Tincture of *Sol* (as *Frater Baſilius* remembereth) even as well as in Gold, doth ſtay and inhere.

Ibid. p. 248.

‘Laſtly, He ſaith it is found by true experience, and the ſentence of all Philoſophers, that the true *aurum potabile* of the Philoſophers, is impoſſible to be had forth of perfect Gold: becauſe the *Aſtra* do forſake Gold, when it is perfect and coagulated into an hard body, which they do not, while they lie in *primo ente.* Therefore that *aurum potabile* that is had *ex primo ente*, is far more perfect, more excellent, and more operative, then that which is made forth of the Metal it ſelf.

Ibid. p. 239, 245.

I may perhaps be condemned, and derided for quoting thoſe Authors, and urging this point ſo far, eſpecially with thoſe that judge every thing a *Chimæra* that they themſelves know, or underſtand not. But let ſuch know, that I onely write to the ingenious and inquiſitive perſons, that purſue this Mineral knowledge; and for the cenſure of the reſt, I neither care for, nor regard.

And all that I would from hence mind the diligent ſearchers of Mines and Minerals of, is carefully to inquire and ſearch for what ſort of Minerals may be found, that are either red, or tranſparent, or both; beſides the Ore of Sulphur (that ſome Authors ſay is red) and of Argent vive, that all knowing Miners underſtand to be of that colour; and *Quercitan* mentioneth ſome *Cinnabar* that is found red and tranſparent; for doubtleſs beſides theſe, there are others that are red, and ſome tranſparent; which is the chief matter I would have inquired after.

CHAP. IX.

Of the ſorts of common Gold, as they are produced by Nature, and in what manner they are ſeverally found.

THere are two ſorts of Gold produced by Nature. 1. That which is called Native Gold, that is *ſtatim ſuum*, pure, and unmixt with any heterogeneous matter, which the *Germans* call **Gedygen Goldt.** 2. That which is decocted, or melted with the force of fire forth of ſeveral matters wherein it lies, which is commonly called refined or purified Gold.

That Gold that is Native, and found pure, unmixed, or that needs no refining; is found, according to *Eucelius* and *Rulandus*, four ways: and that the *Spaniards* call *Palacas*. 1. In Rivers, as in *Tagus*, *Albis*, and *Sala*, which they call Waſh-Gold. And *Munſter* ſaith, ‘That there is much more pure Gold found, then mixed with Earth or Stones, as theſe Rivers witneſs, *Ganges* in *India*, *Pactolus* in *Lydia*, *Hebrus* in *Thrace*, *Tagus* in *Spain*, *Padus* in *Italy*, *Albis & Rhenus* in *Germany*. And *Strabo* tells us, ‘That Gold is not onely digged forth of the Pits, or Mines, but alſo the Rivers and Torrents do afford a Golden ſand; and that by digging of Pits, divers other Artifices, and waſhing the ſand, they get much Gold; and that more did get Gold this way then by Mining. And that amongſt the ſparks or crums of Gold, there are ſometimes found clods, or maſſes of Gold of the

De re Metal. c. 4. p. 14. Lex Chym. Geogr. de auro.

Strab. Geogr. l. 3. p. 137, 138.

‘weight of half a pound, that need little purifying; ‘which they call *Palas*, *quæ ſunt maſſulæ auri.* 2. Native and pure Gold is found in the Mountains of *Arabia.* 3. In Mines, or Pits, partly alone, partly its ‘little ſparks do as it were cleave to a certain white ‘kind of ſtone, which in the *German* Tongue is called ‘**Quartz**; of which there was ſtore at *Cottenheyden.* ‘4. In the heads of fiſhes, which we call *Florellas*, ‘which ſome do account to be the Burn, or Beck-Trout. Of theſe we ſhall ſpeak in order more at large, from ſome approved Authors.

Scept. Chym. p. 372.

1. And firſt of that which is native and pure, *Apyron*, not having tried the fire; of which the Honourable perſon Mr. *Boyle* gives us this account. But that ‘is nothing to what our *Acoſta* ſubjoyns, which is indeed very memorable; namely, that of the morſels ‘of native and pure Gold, which we lately heard ‘him mentioning, he had now and then ſeen ſome that ‘weighed many pounds. To which I ſhall add, that I my ſelf have ſeen a lump of Ore not long ſince digged up, in whoſe ſtony part there grew, almoſt like Trees, divers parcels though not of Gold, yet of (what perhaps Mineraliſts will more wonder at) another Metal which ſeemed to be very pure, or unmixt with any heterogeneous ſubſtances, and were ſome of them as big as my finger, if not bigger. But let us hear *Acoſta* himſelf, who ſaith. ‘They draw ‘Gold in thoſe parts, after three ſorts; or at leaſt I ‘have ſeen all three uſed: For either they find Gold ‘in grains, in powder, or in ſtones. They do call ‘Gold in grains, ſmall morſels of Gold, which they ‘find whole, without mixture of any other Metal, ‘which hath no need of melting or refining in the fire;

Hiſtor. nat. & mor. of the Indies, c. 4. p. 212. 213.

'and they call them Pippins, for that commonly they 'are like to Pippins, or ſeeds of Melons, or Pumpions: 'and that whereof *Job* ſpeaketh, *leve illius aurum*, 'though ſometimes there be greater, and ſuch as I 'have ſeen weighed many pounds. It is the excel- 'lency of this Metal alone (as *Plinie* affirms) to be 'found thus pure and perfect. To this purpoſe I my ſelf have ſeen ſome grain or ſand-gold, that a Gentleman ſent forth of *Guinea*, ſome twenty years ago, to his Siſter for a token, that was pure native Gold, and had not felt the force of fire; many of the grains as big as the ordinary pippin of an Apple, and ſome ſmaller; and one morſel half as long as my little finger, and as thick.

Job 18.

Plin.l.3.c.5.

Peter Martyr, a perſon neither ſuſpected to be guilty of ignorance nor falſity, in naming ſome Rivers in the *Indies* ſaith: 'In the ſands of all theſe Rivers is 'found great plenty of Gold, which the Inhabitants of 'the ſame Iſland which were with us, gathered in this 'manner: making holes in the ſand with their hands, 'a cubit deep; and taking up ſand with their left hands 'from the bottom of the ſame, they picked out grains 'of Gold with their right hands, without any more 'Art or cunning; and ſo delivered it to our men, who 'affirm that many of them thus gathered, were as big 'as Tares or Vetches. And I my ſelf ſaw a maſs of 'rude Gold (that is to ſay, ſuch as was never molten) 'like unto ſuch ſtones as are found in the bottom of 'Rivers, weighing nine ounces, which *Hoieda* him- 'ſelf found. And further he ſaith, The Admiral de- 'clared, that if they would bring Gold, they ſhould 'have whatſoever they would ask. Forthwith turn- 'ing their backs, and running to the Shore of the next 'River,

Decad.1.l.2. p.16.

Decad.1.l.3. p.19.

'River, they returned in ſhort time, bringing with 'them their hands full of Gold. Amongſt all other 'there came an old man, bringing with him two Peble ſtones of Gold, weighing an ounce, deſiring to 'have a Bell for the ſame. And a little after he ſaith, 'Beſide this old man, there came alſo divers other, 'bringing with them Peble-ſtones of Gold, weighing 'ten or twelve drachms, and feared not to confeſs, 'that in the place where they gathered that Gold, 'there were found ſometimes ſtones of Gold, as big as 'the head of a child. He further ſaith, There was a certain King, which gave them a maſs of rude Gold as 'big as a mans fiſt, weighing twenty ounces. This 'Gold was not found in the bank of this River, but in 'an heap of drie Earth, like unto the ſtone called '*Tophus*, which is ſoon reſolved into ſand. This 'maſs of Gold I my ſelf ſaw in *Caſtile*, *&c.* Again, he ſaith of another place: 'As the Miners digged the 'ſuperficial, or uppermoſt part of the Earth of the 'Mines, during for the ſpace of ſix miles; and in divers places ſifted the ſame on the drie Land, they 'found ſuch plenty of Gold, that every hired Labourer could eaſily find every day the weight of three 'drachms.

Decad. 1. l. 4. p. 26.

Decad. 1. l. 4. p. 29.

We ſhall add but one inſtance more from this Author, which though it may ſeem incredible, yet we ſhall leave the cenſure to others. 'Theſe regions (he 'ſaith, meaning *Hiſpaniola*) are very large; in the 'which, in many places, here and there are found 'ſometimes, even in the upper cruſt of the Earth; and 'ſometimes among the ſtones, certain round pieces 'or plates of Gold, ſometimes of ſmall quantity, and 'in ſome places of great weight: Inſomuch that

Decad 1. l. 10. p. 56.

'there hath been found round pieces of three hundred 'pound weight, and one of three thouſand three hundred and ten pound weight, which was ſent whole 'to the King, in that Ship in the which the Governour '*Boadilla* was coming home into *Spain*; which Ship 'was caſt away. And this *Gonzales Ferdinandus Oviedus* ſeemeth to confirm, ſaying thus: Sometimes there are found grains of Gold, of great quantity, and great weight above the Earth, and ſometimes under. And the greateſt of all other that was found to this day in the Iſland, was that which was loſt in the Sea, about the Iſland *Beata*, which weighed three thouſand two hundred Caſtellanes of Gold. Of the Weſt-Indies, p. 190.

2. For pure native Gold being found in *Arabia*, I find nothing aſſerted of the places, or manner how it is found, and therefore ſhall paſs on to the next.

3. Beſides this pure native Gold found in Rivers, Sands, or Earths, there is ſometimes ſome found pure digged forth of the Mines, that needs little or no force of fire, or refining; and ſometimes it lies interſperſed in the clefts of the ſtones, like thin plates, or ſpangles, or like threds or hairs, or the ſmall and tender ſprigs of Plants and Herbs, which are uſually called *metallorum efflorefcentiæ*, the flowers of Metals; but moſt commonly mixed with Earth, Stones, Marchaſites, or other Minerals and Metals; of which we ſhall ſpeak promiſcuouſly, as they occur to our memory, without regard of any ſtrict order.

Rulandus reckons theſe in general: 1. Out of a 'Fire-ſtone of an aſh-colour, and forth of *Galena*, or 'Silver Ore. Alchym. Lex. p. 91.

2. 'Out of a purple-coloured Earth ſo tempered 'with the vapour and ſteam of the Earth, that it is very 'fruitful

Ut ſupr. p.246. ‘fruitful of Gold; from which in the Furnace Gold ‘is drawn in many places.

3. Out of ‘*Chryſocolla*, natural *Borax* or green ‘Earth; and this he ſaith is digged up in *Hungary*, ‘*Burgundy*, and at *Goldtberg* in *Sileſia*, from whence ‘Gold is drawn.

4. ‘Out of the *Cæruleum* or *Lazure*, in which ‘ſometimes Gold is contained.

More particularly he tells us: 1. That Gold is ‘found in the *Carpathian* Mountain, *quod ſtatim eſt* ‘*ſuum*, pure and perfect.

2. ‘Pure Gold digged up in the ſame Mountain in ‘Iron-ſtone.

3. ‘In the ſame Mountain in a white hard flint.

4. ‘In the ſame Mountain out of the ſtone called ‘*Lapis Armenius*.

5. ‘That it is found mixed with other Ores, as of ‘Copper, Silver, and the like.

But now we ſhall give more full teſtimonies of theſe ſorts.

Scept. Chym. p. 371, 372. 1. Mr. *Boyle* relateth theſe two Obſervations. The firſt thus. ‘I remember (he ſaith) that a very skill‘ful and credible perſon affirmed to me, that being in ‘the *Hungarian* Mines, he had the good fortune to ſee ‘a Mineral that was there digged up; wherein pieces ‘of Gold of the length, and alſo almoſt of the bigneſs ‘of a humane finger, grew in the Ore, as if they had ‘been parts and branches of Trees. Secondly, He ‘ſaith, And I have my ſelf ſeen a lump of a whitiſh ‘Mineral that was brought as a rarity to a great, and ‘knowing Prince; wherein there grew here and there ‘in the ſtone, which looked like a kind of a Sparr, ‘divers little lumps of fine Gold (for ſuch I was aſſured

' that trial had manifeſted it to be) ſome of them ſeem-' ing to be about the bigneſs of Peaſe.

2. Beſides what we have before proved concerning the vegetability of Metals in general, this from ſo honourable, and experienced a man as Mr. *Boyle* doth confirm it very much, nay even to the growth and increaſe of Gold: to which therefore we ſhall add more teſtimonies. And I my ſelf have likewiſe ſeen and handled a piece of whitiſh Metal ſent to a great perſon, (of which I yet retain a ſmall piece) which being fluxed, was moſt pure Gold. The Coat in which it was contained, was like white Marble, or our white Plaſter Ore, or Stone; and the Metal grew in it like a thin criſped Plate, or like many threds joyned cloſe together; and ſome of it like two twiſted threds one with another, and might have with a little cruſhing of the ſtone, been ſeparated from it.

And further to prove this germination and ſprouting of Metals like Vegetables, even of Gold. *Rulandus* tells us, That in the exteriour *Pannonia* thin leaves, and ſparks of moſt pure Gold were found in a white and hard ſtone. And *Athanaſius Kircherus* gives us the like anſwer to this very queſtion; from thoſe Mine-maſters, to whom he had ſent, from *Schemnitz*, to his ſecond Query concerning the effloreſcence of Metals, he hath this anſwer. 'That ſometimes in the Mines do occur Cryſtals wrapt about with moſt tender ſilver threds like hairs, and the reſt like. The former years there was found a pure grain of ſilver in *lapide fatuo*, in a fool-ſtone (in the *Ger-' man* Tongue **Taubenſtein**) in a certain white mat-' ter like Chalk, which is called *lapidea medulla*, ſtone-' marrow, as though it had been there laid up on pur-' poſe,

Ut ſupr. p.94.

Mund. ſubter. l. 10. Sect. 3. p.183.

‘poſe, and weighed two pounds. Again to the ſame queſtion from *Herrengrundt* in *Hungaria*, from *John Schapelman*, he receives this anſwer. ‘There are ‘ſometimes found in this Mine, the flowring that are ‘Cupreous, of pure Copper, even as flowers and ‘herbs grow above the Earth. Thirdly, to this que‘ſtion he hath this anſwer from *George Schutz*: That ‘in the Silver Mines there are often found ſilver flow‘erings, where the bright Silver thruſts forth it ſelf ‘in form of a thred, or hair, out of the Metallick ‘ſtones. And that there are found ſhavings (*ramenta*) ‘of pure ſilver, the thickneſs of a finger, though black, ‘and as it were of a leaden colour, &c. Laſtly, Memorable is that paſſage from Father *Andrew Schaffer*, in theſe words. ‘I ſend here a Mineral altogether ‘precious, ſeeing any thing like, more rare is not to ‘be found. Where you may ſee pure Silver flowring ‘into its threds; that which ſhineth yellow, is moſt pure ‘gold; that which is blackiſh, is ſilver mixed with ‘gold.

Ut ſupr. p 185, 186, 187, 188, 189.

Gen. Dier. l. 4. c. 9. p. 198.

These are memorable proofs of the Vegetability of Metals, and may make us give the more credit to the Story of *Alexander ab Alexandro*, that in *Germany* there were Vines that brought forth little branches, and whitiſh leaves, of pure Gold, which was given to Kings and great Captains, together with the ſprig or branch of the Vine, with a chinked bark.

Mund. Subter. Ut ſupr. p. 188.

3. We ſhall now ſhew ſome other ſubſtances wherein Gold is found, and by the force of fire drawn forth, and ſeparated from them. *Kircher* tells us, that in the *Hungarian* Mines, there was an Ore found that contained Copper, Silver, and Gold: as alſo a ſilver *Marchaſite*, which had mixed with it gold. Alſo ſhi-

ning Lead Ore, or *Plumbago*; which contained Gold and Silver; that likewiſe there was a Mine of Antimony that held in it ſome Gold. The learned *Wormius* tells us, that 1644. the noble *John Sigfridus* being

Muſ. Worm. l. 1. Sect. 3. c. 2. p. 114.

general Overſeer of Metallick matters, found a Mine of Gold, the Ore being black and like Talk, ſhining with frequent grains; which when he had tried, an hundred weight of the Ore yielded thirty eight marks of pure Gold. That a maſs of another Vein 1646. did, being purified, yield ſix drachms of pure Gold, contained in one pound. This Ore ſhined with leſſer grains then the former, and more tending to redneſs. Likewiſe that there were other Ores brought from the ſame place, that were like Talk, and pregnant with frequent granates, which many thought, did abound with Gold, &c. And although before I had omitted it, I ſhall here inſert what *Diodorus Siculus* delivers of the *Arabian* gold; who ſaith, There is Gold digged

Biblioth. l. 2. c. 12. p. 65.

up in *Arabia*, which is not melted with the fire, as is accuſtomed amongſt others. But as ſoon as ever it is digged up, it is found like to *Cheſnuts*, and is of ſo lucid a colour, that it makes the precious ſtones included by Artificers in Gold, moſt ſplendent. And that in that part of *Egypt* that lieth towards *Æthiopia*

Lib. 3. c. 11. p. 73.

and *Arabia*, there are places that are very fertile of Metals; and from whence with great coſt and labour they draw forth Gold, from a moſt pure white ſhining Marble.

But of this we ſhall ſay no more but refer it to the next Chapter.

4. But for Gold found in the heads of *Florella's* or Beck-trouts, we find little in particular, but onely that they affirm it in general. And *Kircher* tells us, that

Picus Mirandulanus (but he quotes not the place) relateth, Mund.ſubter. l.10. Sect 4. p.200. ‘That in his time gold was found in the ſtomach of Partridges; and addeth his reaſon, that it was no marvel, for that Hens, Partridges, Ducks, and the like, do much deſire metallick bodies; and therefore finding the raments or ſmall ſhavings of Gold commixt with the ſand, do ſwallow them; which after by the heat of the ſtomach do flow into one maſs, which is a rational conjecture. And ſaith, that they report that Goats that are called *Ibices* were ſeen, whoſe teeth were ſpred over with a golden colour, eſpecially in that part with which they did pluck up the graſs; which without doubt did happen from the tincture of Gold-bearing ſpirits, wherewith the graſs was imbued. And alſo tells us, that *Albertus* relateth that Gold was found in an humane ſcull; which if it were truth, happened from no other cauſe then the ſteams of gold, when melted do ariſe, and no otherwiſe then quick-ſilver was coagulated in the brain. A reaſon I confeſs more probable then what *Sendivogius* and others have given of it. *Hiſt.* 1. And I my ſelf can affirm by experience and ſight, that here in theſe Northern parts, where Sheep are bred upon barren mountains and hills (likely enough to contain metallick Ores) that their teeth are often (if old) at the roots of them, covered with a thin tincture of a very bright ſhining and golden colour. *Hiſt.* 2. And I had ſome years ſince brought me by a friend two or three of the molares or grinding teeth of an old Cow bred upon ſuch barren hills, and killed for Beef, which near the roots were covered with a cruſt thicker then our common Groat, with a fine ſhining gold-coloured ſubſtance, which for the rarity of it I keep by me, and did not ſcrape it off to trie if it contained any metalline matter. Which doubtleſs had gathered there, by the ſteams either of golden Marchaſites, Copper Ore, or Gold it ſelf, while yet in *primo ente*. Of which I hope to enquire more, that I may be able to make a trial of it, and thereby to ſatisfie my ſelf and others, whether it contain Metal or not; for the Proverb is true, *All is not Gold that gliſters.*

Chap. X.

Further of the Stones, Rocks, and Flints of Gold, and the ſtriking paſſages wherein it is found: as alſo of the ſeveral ſorts of it mentioned in Scripture, and elſewhere.

THe reaſon why I am ſo large in this particular is, to mind all ingenious Mineraliſts to make a more diligent ſearch how all Ores lie, and in what wombs, coats, or ſubſtances, then hitherto hath been uſed; and eſpecially about the Ore of Gold: and to this end we ſhall tranſcribe what we find moſt material to this purpoſe.

And in the firſt place we ſhall give the Reader an account of what *Baſilius Valentinus* hath diſcovered in this particular; a perſon of vaſt experience in theſe matters, who writeth thus. 'This noble gold-ſtone 'and Ore is ſometimes mixed, and on its outſide there ſticketh ſome obſcure and dark matter, having annexed

Laſt Will and Teſt. par. 2. c. 3. p. 84, 85, 86.

‘nexed to it ſome ſlates and other ſpermatick matter, which detracts from the goodneſs of its own nature. And though the Creator hath indued it with great virtues, yet doth it humble it ſelf, and ſuffers it ſelf to be found in deſpicable Mineral ſtones, where it loſeth much of its tincture; as is apparent by the Touch-ſtone, where the mixture of Copper, Silver, Tin, and others, is ſeen; all theſe mixed impurities can be ſeparated from it with artificial manuals; and with little ado it may be brought into a perfect ſtate. Gold Ores naturally are wrought thus; that the Gold ſtands in it cloſe, compact, firm, and good; which is found ſometimes in the croſs paſſages. Its fixedneſs is found in the deepneſs under ground, where it hath its greateſt power; and it is found alſo ſometimes in a ſpeckled Jaſpis, full of eyes, and mixed with flints in its paſſages; where many times Vitriol flint is found abundantly, which Vitriol is the beſt among all other ſorts of Vitriol. The *Hungarian* Vitriol hath the precedence before all the reſt, which is ſufficiently known in their proofs, and examens, as may be demonſtrated to the eye. In its paſſages are found ſometimes fluxes of ſeveral colours, which are interlined with gold, and muſt be forced with fire. To that purpoſe it is requiſite that it be dealt withal with ſuch fire, as you heard in the firſt part: commonly *Zwitters* and *Zirn* ſtones are ſuch, which muſt be ſtamped, and beaten, and drawn to a narrowneſs, and fined.

‘Gold is wrought alſo in ſtanding paſſages, and on level ground; the Ores and ſuch paſſages are yellowiſh, rocky, and of a iron ſhot-ſand in clifts, as it is on-grown compactly. And generally it is found

‘ near Flint works, ſometimes it is found in a Flint, or ‘ in a liver-coloured Jaſpis, ſometimes in white pe‘bles, that gold that is in it is of a white colour, like ‘ ſilver, or in white Copper Ore, where it ſticketh ‘ hoary and rugged: It is found alſo in brittle lime‘ſtones, where it ſtands curled with black ſpecks un‘ſprinkled, is granulated like drops found in the ſub‘tileſt firm ſtones, ſpotted with iron-molds, or ſpots; ‘ and are protruded in fair yellow flowers, and are a ‘ black exhalation thruſt forth. It is found alſo in ‘ ſtreaked ſlate-work in pure paſſages, mixed with a ‘ blue horn-ſtone, and ſlate; in flinty glittering paſſages ‘ it is found hoary, and compactly wrought. There ‘ are found alſoflat Marble floats, wherein in all your ‘ clifts is wrought inherent gold, mixed with green ‘ grit, and iron ſpots. Sometimes it is found alſo in ‘ ſquare iron ſhots, or porous marble Marchaſites, ‘ but for the moſt part in grits. Sometimes gold Ore ‘ is found alſo compact, and firm, in black paſſages. ‘ Some gold Ores and gold paſſages are found alſo to ‘ be of Minerals, and of Vitriol; and Miners in *Hun‘gary* eſpecially can diſcourſe of it, becauſe gold Ore ‘ is found in that manner in thoſe parts.

Theſe ſeem to me to be excellent diſcoveries and directions to find out the Ore of this Metal; and though the terms ſeem harſh and difficult, our *Engliſh* not ſo properly ſuiting the *German* Tongue, eſpecially about this ſubject; yet doubtleſs may be familiar to experienced Miners, *& artifici in ſua arte credendum eſt.*

Acoſta likewiſe tells us, Gold is commonly found ‘ mixt with Silver or with Copper, but that which is ‘ mixed with Silver, is commonly of fewer Carats

Hiſtor. nat. & mor. of the Indies, c.4.p.214.

'then that which is mixed with Copper. If there be 'a fifth part of ſilver, *Pliny* ſaith, it is then properly cal-'led *Electrum*, which hath the property to ſhine more 'at the light of the fire, then fine gold, or fine ſilver. 'That which is incorporate with copper, is common-'ly of a higher value.

Plin.l.3.c.4.

Franciſcus Calceolarius tells us, that in his *Muſæum* he had three ſorts of the Ore of Gold.

Muſ. Veronenſ. Sect.4.p.436.

1. 'One brought forth of *Pannonia*, in which there 'was a white colour, like ſilver.

2. 'Another ariſing with ſilver, forth of a ſtone heavy enough, of much-what an aſh colour, brought from the Mines of *Bohemia*.

3. An Ore flowing forth of a ſtone of a very red 'colour, in which was ſeen Copper growing, ſhining 'with an inſet colour from the ſame Mines.

Agreeable to what is here related may be found in *Agricola*, to whom I refer the Reader: and onely ſhall add a paſſage or two more from *Baſilius*, who ſaith: 'To diſtinguiſh Metals by colours, is a curious 'skill, as red-gold-glaſs, mine-green, black Ore; 'however their working is not ſo exactly known that 'way.

De nat. Foſſil. l. 8. p 640.

Laſt Will and Teſt. l.1.c.8. p.18.

And a little after he ſaith: 'Hither belong all mixt 'Ores, which at ſeparating are parted aſunder, and not 'before, as the cuſtom is. As in *Hungary* there is had e-'very where gold-ſilver (that is, in it there is gold) 'which in its colour and ponderoſity is pure, hath loſt 'nothing, and is ſtill in its working quality, and if it had 'not been interrupted, and digged up unſeaſona-'bly, then the ſilver would have been turned into 'pure gold.

Lazarus Ercker, that was chief Mine-maſter to *Maxi-*

Lib.1.p.41.

Maximilian the Emperour, tells us; ‘That Gold is ‘found in a white ſtone like marble, the *Germans* call ‘it **Quartz**; as alſo in a blue and yellow horn-ſtone: ‘likewiſe in a blue ſlate, iron, ſlats, yellow and of a ‘ſubtile flaming; and ſometimes in corn, tin, and iron-‘ſtone.

And once more *Paracelſus* tells us, (ſpeaking of the ſeparating of Metals forth of their Ores, and one from another:) ‘Theſe ſorts of Ores ſometimes will con-‘tain more then one Metal; as it often happens, that ‘Copper and Silver, Copper and Gold, Lead and Sil-‘ver, Tin and Silver, &c. may be found in one ‘Mineral.

Rer. Nat. l.8.p.101.

Now for the gradual differences of Gold, they may be, and doubtleſs are many; for in fineneſs and purity there may be much diſagreement; and therefore *Baſilius* offers us a notable paſſage, thus. ‘And take ‘notice that Nature loveth to keep her own ways or-‘derly, and keeps together two, and ſometimes three ‘ſorts of Ores in their aſcenſion and deſcenſion, ‘whereby ſhe intimateth a way unto the after-work; ‘but men in their fanſies think upon other means, ‘though to no purpoſe. View all the Mines which ‘are in *Europe*, you will find no other Ores but im-‘pure ones, that is, a mixture of them; for their Na-‘ture maketh them ſo, as much as ever I could learn. ‘If you can ſhew me the contrary, I will aſſent un-‘to it.

Laſt Will and Teſt. par.1. c.11. p.25,26.

And again he ſaith; ‘Who could tell what gold ‘and ſilver were, if they were not known in their ‘perfection; for when they are perfect it appeareth, ‘when they have their colour, their weight, their mal-‘leableneſs, their flux and hardneſs. And this per-

Ibid.c.12.p.27, 28.

'fect Metal Nature hath produced compactly and 'purely: for ſuch perfect, pure, and compact gold is 'found in *Hungary*, in the white marble, which pre- 'ſently may be broken: as alſo ſilver and copper. The 'difference betwixt the perfect and pure is, becauſe 'Metals are not pure before they are perfect, and ſo 'there may be a perfect Ore which is not pure, which 'defect is found in many of our Metals, which come 'to their perfection as ſoon as in any other Foreign 'parts, but in their perfect purity they are defective 'ſometimes. And this we commend to the Reader to be ſeriouſly conſidered of.

Now from hence we may gather, that even one ſort of gold, as it is gold, may be more fine and pure then another. And the Scripture doth ſhew us, that in thoſe days gold was found to be, and eſteemed, one ſort better and purer then another; of which we ſhall now ſpeak ſomething largely for diverſion ſake, and to ſtir up all ingenious ſpirits to a more narrow ſcrutiny after theſe curioſities.

Gen. 2, 11, 12. 1. And firſt it mentioneth the gold found in the Land of *Havillah*, and ſaith; And the gold of that is *Zahab to'b*, that is good: intimating plainly that there was other gold that was worſe, and not ſo good. But where that gold was found, is ſomething doubtful; though *Tremellius* maketh *Piſhon* there to be the River *Tygris* that runneth all along the Inland into the *Sinus Perſicus*, and takes it to be the Country of the *Suſians* in the edge of *Perſia*; and calleth it *aurum præſtans*, that is excellent gold, and the Vulgar Latine calls it *aurum optimum*. And as to the place, *Piſcator* doth agree; which I leave to others to be diſputed of. *Caſtalio* calls it *aurum probatiſſimum*; but that it ſhould

Not. in Gen. 10. 7.

ſhould be the beſt, agreeth not exactly with the Hebrew word *to'b*, which implieth not the ſuperlative degree, and therefore the Septuagint renders it τὸ χρυσίον καλὸν, good gold. And *Luther* renders it, that is precious gold. And ſo do the *French* and *Italian* Bibles tranſlate it good gold, not the beſt.

2. Though *Zahab* be the primitive word, the Hebrews moſt commonly uſe for Gold; and that ſome Lexicons take it to be meant of raw and unwrought Gold, yet ſometimes they add ſome other word or Adjective unto it, that doth ſpecifie ſome notable degree of the goodneſs of it, or ſome other quality: and in many places *Sagur* of the Verb *Sagar clauſit*, which *Montanus* where the Text ſpeaketh of *Solomons* covering the Oracle, he ſaith, *auro concluſo*, or *puriſſimo*; but *Tremellius* (whoſe reaſon for this is the likeſt in this place) gives it, *auro aſſervato*, meaning the gold that *David* had preſerved for that purpoſe of building the Temple; and it is not likely that *David* for a work of that nature, would not have kept any Gold, but that which was moſt pure; and in this ſenſe that *Tremellius* gives, I find no place to contradict it.

1 King. 6 20, 21.

3. They uſe the word *Kathem*, which commonly ſignifieth a maſs of bright and ſhining Gold, from the word *Katham emicuit*, it hath ſhined, or been bright; and to this they add *Tahur* from the Verb *Taher mundus fuit*, and this ſignifieth a maſs of pure and clean Gold, and was moſt uſually reckoned amongſt their beſt ſorts of Gold.

Vid. Job 28. 17, 18, 19. 20. & aliis locis.

4. They uſe the word *Phas* or 1. *Pas* from the Verb *Paſas*, *deauratus eſt*, it is covered over with Gold, and that very pure; for it is ſaid: And the King made a Throne of Ivory, and covered it over. 2, *Mepaſas*, that

1 King. 10 18.

that is with pure Gold ; and ſometimes it is taken for
Je.10.9. that pretious ſtone that is called *Topazion*. And it is
not unlike but that it was brought from a place of that
name, for it is ſaid ; That ſilver ſpred into plates, was
brought from *Tharſis*, and Gold from *Uphaz*. And
Dan 10.5. again, *Then I lift up mine eyes, and looked, and behold,*
a certain man cloathed in linen, whoſe loyns were
girded with fine gold of Uphaz. Where the word
Kæthem is uſed, as coming from that place called *Uphaz*;
Vid. Polan. in loc. citat. and *Arias Montanus* renders it, *in maſſa auri*
obrizi. But it is plain that *Uphaz* was the proper
name of a place, and not to be taken adjectively ; and
is thought to be the ſame with *Ophir*, of which we
ſhall ſay more preſently.

Job.28.1,6. 5. We may obſerve that it is probable that in the
time of *Job*, Gold was gotten forth of the Earth, or
Rocks, or ſeparated from the ſand. For he ſaith, as
Vid. Author. in loc. *Piſcator* renders it, and *Tremellius* ſeems ſo to expound
it ; ‘ Surely there is a vein for ſilver, and a place for
Gold where they find it : and it (the Earth) hath duſt
of Gold.

6. But the Gold that was known in the days of
King *Solomon*, that had the chiefeſt commendation,
was that which was brought from *Ophir*, or *Uphaz*;
for it is taken by all the Learned, that they were
both one place. And this is in divers places of all
Job 28.16. other moſt commended. For *Job* preferring wiſdom
before all earthly things, ſaith it ſhall not be compared
with *Kæthem Ophir*, naming that ſort of Gold
that was accounted the moſt excellent and pure above
all other, nor it ſhall not come in competition with
Pſal 45 9. *Kæthem tahur*, the maſs of the pureſt Gold. And *David*
ſetting forth the glory of Chriſts Kingdom and

the Church under the perſon of a Queen, ſaith; *Upon thy right hand did ſtand the Queen in Gold of Ophir, Kæthem Ophir, in maſſa auri Ophir,* as that ſort of Gold that was moſt pure and excellent in eſteem in thoſe days. And that this gold was fetched by *Hiram* from *Ophir*, theſe places do teſtifie. *Then went Solomon to Ezion-Geber, and to Eloth at the Sea ſide, in the land of Edom. And Huram ſent him by the hands of his ſervants, ſhips and ſervants that had knowledge of the ſea; and they went with the ſervants of Solomon to Ophir, and took thence four hundred and fifty talents of gold, and brought it to King Solomon. For the Kings ſhips went to Tarſhiſh with the ſervants of Huram: every three years once came the ſhips of Tarſhiſh bringing Gold and Silver, Ivory, and Apes, and Peacocks.* Now the great queſtion being amongſt the Learned, where this *Ophir* or *Uphaz* was, from whence was brought the moſt pure Gold that was known in the days of *Solomon*; Sir *Walter Rawleigh*, a perſon of profound judgment, and great learning, hath extreamly laboured to prove that it was not from *Peru* in the *Weſt Indies*, but brought from an Iſland in the *Eaſt Indies*, called by the name of *Ophir*; and to make this good he hath ſtrained all poſſible or probable arguments to aſſert it. And ſo hath *Joſephus Acoſta*, and many others.

1 King 10. 11.
2 Chron. 8. 17, 18.

Id. c. 9. v. 10, 21.

Hiſt. of the World. l. 2. part. 1. c. 18. parag. 3. p 425.
Hiſt. of the Ind. c. 13. p. 41, &c.

But notwithſtanding the authority of ſuch learned perſons, I am of an opinion that their arguments are not of ſuch force but that they may be eaſily anſwered, as having no other ground but probability and conjecture; but we have no time to beſtow that way, but ſhall lay down that proof that may demonſtrate that the land of *Ophir* or *Uphaz* was the two *Peru's* now known to *Europe*: For that text is ſo plain, that no reaſonings

2 Chron.3.6. reaſonings can be able to overthrow it. For it is ſaid in the text ; *And the gold was the gold of Perualm.* And all men know that the Hebrews put *a-im* in the dual number,as *Peru* being the ſingular number, when *a-im* is added to it in the dual, it makes *Perualm.* Which muſt of neceſſity be the name of a place or Country. Which Epithete they could not have given to their beſt and pureſt gold, if there had no ſuch Country been known to the *Jews* in the time of *Solomon* ; and indeed could be no other then the two *Peru's* now known to the *Europeans.* And the Septuagint renders it Φαρȣὶμ, which in a manner is the ſame. And the French Bible, *Et l' or eſtoit or de Pharuaim,* which agreeth with the Hebrew. And *Tremellius* renders it, **Aurum autem ipſum erat aurum Paruaimorum :* and to the ſame purpoſe the Italian Bible ſaith, *Et l'oro, era oro di Paruarim ,* as though it were the Gold of the people of the Country ſo called, which amounteth to the ſame purpoſe. Greg.Lex.Sarr. præf. And *Luther* calls it **Das Goldt war Parwaym Goldt.** And therefore an Author of great learning and credit, ſaith ; ‘ *Terra igitur illa, ex qua* ‘ *tanta optimi auri copia Solomoni advecta fuit, & ad* ‘ *alias gentes aſportata , jam tum Paruaim dicta fuit ,* ‘ *quam hodie Peru vocamus : quæ ad Europæi orbis noti-* ‘ *tiam & Mercimoniorum uſum Chriſtophori Columbi* ‘ *ſagaciſſima pertinacia anno ſupra milleſimum quadrin-* ‘ *genteſimum nonageſimo ſecundo traducta, Hebræis au-* ‘ *tem veteribus fuit exploratiſſima. Verba Ariæ Monta-* ‘ *ni in libro Phaleg, id eſt, de gentium ſedibus & ſitu* ‘ *orbis ita habent. Dictio Paruaim iis qui vel tantum* ‘ *ſciunt Hebraice legere , duas regiones olim Peru di-* ‘ *ctas clare demonſtrat, unam quidem, quæ eodem voca-* ‘ *bulo hodierno etiam die Peru dicitur , alteram vero*

‘*quæ nova Hiſpania à navigantibus eſt appellata. Ejus autem regionis aurum puriſſimum atque in maximo pretio apud omnes gentes fuiſſe conſtat. Atque interpres quidem vulgatus vel ob ignotam ſibi regionem, vel potius in ejus, quod illa regio exhibebat, auri laudem (cum in Hebræo ita ſcriptum legatur: & aurum illud aurum Peru & Peru: nam Peru in numero duali Paruaim dicitur) convertit: & aurum erat probatiſſimum. Quocirca quicquid auri inter alias gentes priſcis illis ſeculis in uſu fuit, id fere totum ex illius terræ cavernis elicitum eſſe exiſtimamus, &c.* And thus much by way of digreſſion for the curious to conſider of.

7. We ſhall not inſiſt upon that place in the *Revelation*, where it is ſaid, *And the City was pure gold, like unto clear glaſs. And the ſtreet of the City was pure gold, as it were tranſparent glaſs.* Becauſe it is a prophetical place, and alſo that it was but like unto, or as it were tranſparent glaſs, not that the gold was really tranſparent; of which it may be doubted whether any ſuch gold were ever exiſtent, either by Art or Nature. Rev. 21. 18, 21.

Beſides theſe foregoing ſorts mentioned forth of the Scripture, we find ſeveral ſorts of gold gradually diſtinguiſhed, according to the Regions from whence they are brought, as the *Arabian*, *Spaniſh*, *Hungarian*, and *German* gold, which all differ one from another in the degrees of goodneſs or pureneſs. And the pureſt that we have in theſe days (that I know of) is the ſand-gold brought from *Guinea*, and ſome other places, which is ſo near pure, and unmixt with any other Metals, that the Artificers that beat, or make leaf-gold, and thoſe that draw gold into ſmall Wire, or fine threds, do commonly buy it, becauſe it will ſerve their turns, without uſing the *Aqua ſeparatoria*; and ſo they do the old gold coined by *Edward* the Third, becauſe it hath in it the leaſt alloy of Silver or Copper; and the pureſt Gold that I have ever ſeen, was a piece of *Roman* Gold, ſtamped with the image and name of *Nero*, which was as ſoft, and would have cut as eaſily as Lead.

Nat. & Mor. Hiſt Ind. c. 4. p. 214.

And the goodneſs of Gold is commonly eſteemed according to the number of Carats, of which there ordinarily are 24. though *Paracelſus* makes them 36. For *Acoſta* tells us, 'The moſt famous Gold is 'that of *Caranana* in *Peru*, and of *Valdivia* in *Chille*, 'for that it riſeth with his alloy and perfection, which 'is twenty three Carats and an half, and ſometimes 'more. They make account likewiſe of the Gold of '*Veragua* to be very fine. They bring much Gold 'to *Mexico* from the *Philippines*, and *China*, but commonly it is weak and of baſe alloy.

Chap. XI.

Of the deſcriptions of common Gold according to ſome Authors, and of the properties thereof: as alſo of ſome wayes of beating, ſifting, and waſhing the Ore thereof.

BAcon doth deſcribe, or define Gold thus; *Aurum eſt corpus perfectum,&c.* ‘ Gold is a perfect body ‘ generated of Argent vive, pure, fixed, clear, red, and ‘ of a clean ſulphur, fixed, red, not burning, and hath ‘ no defect. *Rulandus* thus; Gold is the moſt tem‘ perate Metal of all other, yellow, ſhining, ponde‘ rous, equally digeſted in the belly of the Earth, very ‘ long waſhed with Mineral Water; conſiſting of a ‘ pure Argent vive, fixed, clear, red; and of a clean ‘ ſulphur, fixed, red, not burning. In brief, it is the ‘ ſubtile ſubſtance of Argent vive.

Spec. Alchym. c.2.p. mihi 259.

Lex Alchym. p 92.

Libanus gives it thus; ‘ Gold is a perfect Metal fra‘ med of a moſt mature, and moſt pure Mercury, by ‘ the virtue of a moſt excellent ſulphur, and together ‘ with it brought into a moſt tenacious, and the beſt ‘ commixtion, and adorned with a citrine tincture.

De nat. Metal. c.4.p.24.

Wormius thus, ‘ Gold is the moſt pure, and moſt ‘ perfect of all Metals, conſiſting of a moſt pure Mer‘ cury, moſt perfectly concocted, and of a red ſulphur ‘ moſt excellent, and moſt fixed, being exactly min‘ gled and united together: ſuſtaining all the trials of ‘ the fire, and of *Aqua fortis*, moſt heavy; and above ‘ all other Metals extenſible, or to be beaten forth, ‘ ſhining with a yellowiſh colour.

Muſ. Worm. l.1.Sect.3.c.2. p.114.

And theſe are ſufficient, that from hence we may gather ſome of its chiefeſt properties.

Art Aurif p.40.

1. Therefore of all other Metals it is moſt perfectly maturated and decocted by Nature, and is of the moſt equal temper: for as *Trevisan* tells us, *Quare in auro ſunt quatuor elementa in æquali & anatica proportione coadunata.* Therefore the four Elements are in Gold, joyned together in an equal and anatical proportion. But yet taking his ſuppoſition that gold is generated of the four Elements, we are not to underſtand this equality of proportion in reſpect of their equal quantities, but anatical proportion in regard of qualities.

2. Of all other Metals, Gold hath the leaſt portion of external or ſeparable ſulphur (for that it hath ſome, appears by the authority of *Paracelſus* and *Helmont*; the latter of which tells us, That external ſulphur is not poſſible to be ſeparated by Nature, but by one conſtructive liquor) and therefore is in that regard accounted more perfect then any of the reſt.

3. Gold is more denſe and compacted then any other of the Metals, that is, it is leſs porous then any of the reſt, being ſo cloſely joyned *per minima*, that little or none of the air, or *globuli ætherei* (as *Carteſius* calls them) can lodge within its particles. And this is the cauſe of two other of its properties; to wit, its heavineſs, and power of extenſion; both of which are far beyond either of thoſe qualities in other Metals.

4. It indureth not onely all the force of our common fire, but if we may give credit to Writers of ſufficient authority, they do inform us that in the greateſt torture of the fire, it loſeth nothing of its ſubſtance or weight, but rather gaineth; for ſo doth

Wormius tell us in the place above-cited. And it will not onely indure the trial *per cineritium*, or teſting with Lead (which ſilver will alſo abide without waſting) but alſo the probat of *Aqua fortis*, the *cementum regale* by *Antimony*, and that which Artificers call *Quartation.* All which do ſufficiently declare all thoſe perfections and excellencies that Authors have attributed unto it.

As for the beating, grinding, ſifting, and waſhing of Ores in general, from their earthy filthineſs and ſuperfluities, *Georgius Agricola* hath written very largely and learnedly, more then any other Author that I know of. And I could wiſh that ſome perſon that hath ability and leiſure, would tranſlate it into *Engliſh*; for it might be very ſerviceable to our common Miners, that in that particular have little to direct them, but what they learn one from another. But we ſhall onely here note ſome few particulars of beating or waſhing of gold Ore, from two or three Authors of Credit. For *Agricola* tells us, ' Seeing that ' Nature doth for the moſt part bring forth Metals impure, and mixed with earth, concrete juices, and ' ſtones; it is neceſſary, as far as can be poſſible, to ' ſeparate thoſe things from the Metallick veins, before they be fluxed or molten.

Lib. de re Met. 8. paſſim.

1. *Acoſta* tells us, ' Gold in ſtone is a vein of gold ' that groweth or ingendreth within the ſtone, or flint, ' as I have ſeen in the Mines of *Curuma* within the government of *Salines*, very great ſtones pierced and ' intermixed with gold; others that were half gold ' and half ſtone. The gold which groweth in this ' manner, is found in Pits or Mines, which have their ' Veins like to the ſilver Mines, but it is very hard to

Hiſtor. nat. & mor. of the Indies, c.4 p 213, 214, 215.

'draw it forth. And a little after: They refine powdered gold in baſons, waſhing it in many waters, until the ſand falls from it, and the gold as moſt heavy remaineth in the bottom. They refine it likewiſe with Quickſilver and Strong-water, for that the Allom whereof they make this water, hath the vertue to ſeparate gold from droſs, or from other Metals.

Lib.3.c.11. P.73. 2. *Diodorus Siculus* tells us a ſtrange ſtory both of the getting of gold Ore, as alſo of its preparing by beating, grinding, and waſhing, which for brevity ſake, we ſhall onely give in the *Engliſh*. 'In the borders of *Egypt* that joyn to *Ethiopia* and *Arabia*, there are places very fertile of Metals; Forth of which with much labour and expence, Gold is drawn. For the black earth by nature hath paſſages, and veins of moſt white marble, which ſhineth above all brightneſs. And a little after, he ſaith, That almoſt infinite thouſands of men do dig forth with iron inſtruments, the more ſoft rock, and which is broken with indifferent labour. He that diſcovereth the Veins of gold, goeth before the Workmen, ſhewing what places they are to dig. They cleave the ſtony marble being ſhewed, by the ſtrength of ſtrong bodies, not by Art, but by great force with iron wedges. But they drive ſhafts or paſſages not ſtreight, but that way which Nature leadeth, by the gold in the ſhining marble. But when by reaſon of the divers bendings, and turnings, they are darkned in their paſſages, the Workmen carrying lights before them, the rocks by great force being cut in pieces, they carry up, and caſt upon the ground. Others cut them ſo caſten into very ſmall pieces, others carry 'them away. The pieces taken from theſe Workmen 'being cut to a certain meaſure, they beat in ſtone 'Veſſels with a peſtle or hammer of Iron, unto the 'ſmallneſs of Millet-ſeeds. They then being caſt into 'Mills, are grinded unto the very fineneſs of meal. 'Then the Workmen taking it ground, do put it upon 'broad Tables a little declining, and again beat, or 'rub the Marble, water being caſt upon it: By that 'means the earth being waſhed away, the gold by its 'gravity doth remain upon the Tables. This they 'often iterating, they rub the Gold with their hands. 'Then with thin and porous ſponges, they preſs forth 'the ſoft earth, until it be made like unto golden ſand. 'Laſtly, other Workmen do put it by weight and 'meaſure into earthen pots; and do ſuperadd in a 'certain meaſure, Lead, Sea-weed, or Tange, and Bran 'of Barley. Theſe things compounded in a certain 'proportion, they diligently lome or daub up the pots 'with clay, or lute. Furthermore, being decocted 'five whole days and nights in a Furnace, pure Gold 'is onely found in the Veſſel, the other things being 'waſted, the former weight being little diminiſhed. I have the rather delivered this at large, becauſe it is a very remarkable paſſage, and perhaps not taken notice of by many Readers, and may be of ſome conſiderable uſe to an ingenious Mineraliſt.

Of the Weſt Indies, p. 188, 189, 190.

3. *GonZalus Ferdinandus Oviedus* relateth two notable ways both of their finding of Gold at the *Indies*, and of the waſhing and purifying of it: and that not by hear-ſay, but upon his own experience; ſome of which we ſhall tranſcribe, becauſe I believe the Book is not very common. Who ſaith, 'This 'particular of the Mines of Gold, is a thing greatly to

‘ be noted, and I may much better ſpeak of it then any other man, foraſmuch as there are now twelve ‘ years paſt ſince I ſerved in the place of Surveyor of ‘ the Melting-ſhops pertaining to the Gold Mines of ‘ the Firm Land, and was the Governour of the ‘ Mines of the Catholick King *Don Ferdinando*; after ‘ whoſe departure from this life, I ſerved long in the ‘ ſame room in the name of your Catholick Majeſtie. ‘ By reaſon whereof, I have had great occaſion to ‘ know how Gold is found and wrought out of the ‘ Mines, &c. And a little after he ſaith: The manner how Gold is gathered, is this, either of ſuch as is ‘ found in *Zanana*; that is to ſay, in the Plains and ‘ Rivers of the Champian Countrey being without ‘ Trees, whether the earth be with graſs or without; ‘ or of ſuch as is ſometimes found on the Land without ‘ the Rivers, in places where Trees grow; ſo that to ‘ come by the ſame, it ſhall be requiſite to cut down ‘ many, and great Trees. But after which ſoever of ‘ theſe manners it be found, either in the Rivers or ‘ Breaches of Waters, or elſe in the Earth; I will ‘ ſhew how it is found in both theſe places, and how it ‘ is ſeparate, and purged. Therefore when the Mine ‘ or Vein is diſcovered, this chanceth by ſearching and ‘ proving in ſuch places, as by certain ſigns and tokens ‘ do appear to skilful men, apt for the generation of ‘ Gold, and to hold Gold. And when they have found ‘ it, they follow the Mine, and labour it, whether it ‘ be in the River or the Plain, as I have ſaid. And if ‘ it be found on the Plain, firſt they make the place very clean where they intend to dig, then they dig eight ‘ or ten foot in length, and as much in bredth; but ‘ they go no deeper then a ſpan or two, or more, as 'ſhall ſeem beſt to the Maſter of the Mine, digging 'equally; then they waſh all the earth which they 'have taken out of the ſaid ſpace, and if herein they 'find any Gold, they follow it, and if not they dig a 'ſpan deeper, and waſh the earth as they did before: 'and if then alſo they find nothing, they continue in 'digging and waſhing the earth, as before, until they 'come to the hard rock or ſtone: and if in fine they 'find no Gold there, they follow no further to ſeek 'Gold in that place, but go to another part. And it 'is to be underſtood, that when they have found the 'Mine, they follow it in digging in the ſame meaſure 'in level and depth, until they have made an end of 'all the Mine which that place containeth, if it appear 'to be rich.

Their manner of waſhing he thus deſcribes, 'And 'when they have digged forth the Mine, they fill certain Trays with that earth, which other *Indians* have 'the charge immediately to receive at their hands, and 'to carry thoſe Trays of Earth to the Water where it 'may be waſhed: yet do not they that bring it waſh 'it, but deliver it to other, putting it out of their 'own Trays into others, which they have ready in 'their hands to receive it. Theſe Waſhers for the 'moſt part are Indian women, becauſe this work is 'of leſs pain and travel then any other. Theſe women when they waſh, are accuſtomed to ſit by the 'water-ſide with their legs in the water even up to 'the knees, or leſs, as the place ſerveth their purpoſe; 'and thus holding the Trays in their hands by the handles thereof, and putting the ſame into the Water, 'they move them round about, after the manner of 'ſifting, with a certain aptneſs; in ſuch ſort that there ‘entereth no more water into the Trays then ſerveth their turns; and with the ſelf-ſame apt moving of their Trays in the water, they ever avoid the foul water with the earth out of the one ſide of the Veſſel, and receive in clean water on the other ſide thereof: ſo that by this means, by little and little, the water waſheth the earth as the lighter ſubſtance off the Trays, and the gold as the heavier matter reſteth in the bottom of the ſame, being round and hollow in the middle, like unto a Barbers Baſin. And when all the earth is avoided, and the gold gathered together in the bottom of the Tray, they put it apart, and return to take more earth, which they waſh continually, as before. So that to conclude, there are in all five perſons ordinarily aſſigned to every Tray of Waſhers.

I have been the more tedious upon this ſubject, becauſe I judged it very material and profitable; but now we ſhall come to ſome higher queſtions concerning Gold, and ſo leave it.

CHAP. XII.

What may be thought of common Gold; whether it be an ingredient into the Philoſophers Tincture, or not? What may be ſaid of Aurum potabile, *or the Tincture of Gold; and what of the white body when the Tincture is taken from it; and ſomething of the* Alcaheſt.

I Very well underſtand that I ſhall undergo no ſmall cenſure, for taking upon me to intermeddle with ſuch abſtruſe matters as I have propoſed in this Chapter. And ſome may deem that it is my ambition to be thought or eſteemed an Adeptiſt; or at leaſt to ſpeak my ſelf ſo highly knowing in theſe Arcana's, that thereby I may draw ſome to make ſuit unto me for further unveiling of theſe ſecrets. To which I ſhall ſay little, but onely this, that my Motto hath long been, and is, *Qui bene latuit, bene vixit*; and however they may cenſure, I ſhall eaſily paſs by it, and anſwer with that of *Paracelſus*, *Alterius non ſit, qui ſuus eſſe poteſt*: and ſhall modeſtly tell them, that it is above 35 years ſince I firſt learned a courſe of common Chymiſtry under old *Johannes Huniades*; and have ever ſince at times and ſeaſons been imployed therein; and have been and am a continual reader of and ſtudier in the beſt Authors that have written in myſtical Philoſophy; and therefore let none be too cenſorious of what I know, or what I know not, in this abſtruſe Science, but weigh the

Authorities and Reaſons that I lay down, and accordingly judge of what I write.

1. For thoſe that are ſeeking the grand ſecret in Animals or Vegetables, or in any thing that they produce, or that proceeds from them, or in any Minerals or Metals, except in ☉, ☽, and Mercury, we ſhall paſs them by, as looking at thoſe as things that are too far removed from the intention of the Philoſophers: who if they did mention them, it was onely by way of ſimilitude, as *Bacon* tells us; *Quare admirandum eſt, quod aliquis prudens ſuam fundat intentionem ſuper animalia, ſive vegetabilia, quæ valde ſunt remota, cum inveniantur mineralia ſatis propinqua. Nec credendum eſt omnino, quod aliquis Philoſophorum poſuerit artem in prædictis remotis, niſi ſimilitudinarie.* Spec. Alchym. c.3.p. mihi. 260.

But thoſe that think they come neareſt the mark, do fix upon the nobleſt of Metals, to wit, Gold; taking that of *Augurellus* for a truth, (which is ſo indeed, if rightly underſtood) *In auro, ſemina ſunt auri, & ut ignis eſt principium ignificandi, ſic aurum aurificandi*; and finding the Maſters do call the Gold that they uſe in the firſt work (for we ſpeak not here of fermentation) their Gold not *aurum vulgi*, they therefore commonly pitch upon pure Gold, ſuch as is much ſand gold, or as the *Germans* call it, Waſh gold, that hath not been melted in the fire; and this many of the wiſer ſort do take to be living gold, ſtrengthened by that ſubtile aſſertion of *Sendivogius*, who ſaith, *Scito enim metallorum vitam eſſe ignem, dum adhuc in ſuis mineris ſunt, & mortem etiam ignem fuſionis videlicet.* No. Lum. Chym Tract.3. p311. And if to this they add what *Treviſan* hath written in that learned and abſtruſe Epiſtle of his to *Thomas* of *Bononia*, it would in a manner convince an underſtanding perſon, to believe that common gold being decocted in their *menſtruum*, would communicate its vertue to their water, by which the whole magiſtery might be perfected; but it is good to be wary, *latet anguis in herba:* and therefore the learned *Mayerus* gives us this caution, *ut perſpicuus apparet, ita profundus deliteſcit.*

And I ſhall crave pardon of thoſe that are learned in this point, if I do not adhere to this opinion; for though I may confeſs that Gold by fuſion in the force of fire, is thereby dead, yet my queſtion is, that it was dead before; and ſo after fuſion that may be more amply prædicated of it, though it was truly dead before, as when a man is ſlain by a mortal wound, he may be ſaid to be dead, when he is abſolutely cold, and no motion of life in him; and much more he might be ſaid to be dead when his body (like the cuſtom of the *Romans*) is burned.

And to confirm that Gold and other particular Metals are dead when they are coagulated into an hard and fixt metallick body, we ſhall give ſufficient authority.

And firſt, *Baſilius Valentinus* (a man of unqueſtionable verity and experience) tells us thus. ‘In the firſt place be informed, that our Gold (ſo much ſpoken of hitherto) muſt never be taken for ſuch Gold by any of our Diſciples, which hath been melted and fully digeſted by Nature; for herein ſuch errour is committed, that men dilapidate all that they have, and loſe both the end and beginning of all their Works.

Elucidat. of the 12. Keyes, p. 140.

From this it clearly appeareth, that not onely gold that hath been melted, is excluded from the beginning of their Work, but alſo gold that hath been fully digeſted by Nature; for who can expect life from a dead thing?

Rer.Natur.l 9. p.113.

To this we may add that ſignal paſſage of *Paracelſus*, quoted by us once or twice before, though not this very purpoſe, who ſaith: *Primo ſciendum eſt, metallum quodvis, quamdiu in primo ente adhuc latet conditum, peculiaria ſua Aſtra habere. Ita aurum habet aſtra Solis: Argentum aſtra Lunæ, &c. Quamprimum autem ad ſuam perfectionem venerunt, & in fixum metallicum corpus coagulantur, ab illorum quolibet ſua aſtra recedunt, & corpus ſuum relinquunt mortuum.* And a little after he tells us; *Et una intelligendum, ad utriuſque tincturæ, rubræ ſcilicet & albæ, præparationem initio non corpus auri vel Lunæ, ſed primum ens auri vel Lunæ aſſumi debere. Si enim in principio error committatur, de opera & labore omni actum erit.*

From whence it is not onely plain, that gold when coagulated into a metallick body, is dead; but alſo that it is in vain to take it in the beginning of the Work.

Theatr. Chym. vol.1.p.754.

Treviſan tells us the ſame thing, ſaying; *Corpora vulgaria, per naturam ſolam in mineris abſoluta, ſunt mortua, ut imperfecta perficere nequeunt, &c.*

De Sal.Phil. l.c.4.p.157.

And the learned *Combachius* in his Tranſlation of *Nuyſement*, tells us this certain rule. ‘*Prudentes & naſi emunctioris homines, ex radice opera ſua incipiunt, & non ex ramis: Eligentes, ut doctiſſimus Bacon ait, rem, ſuper quam natura tantum primas operationes incepit, per unionem & mixtionem proportionatam puri & vivi Mercurii, cum ſimili ſulphure in maſſam ſolidam congelati.* And this is a clear point which

Bacon further explaineth thus; ſhewing how they are excuſed from taking gold to the compoſition of the red, or ſilver to the white. ‘*Cum inveniamus rem, ‘vel corpus aliquod, ex tam mundo, vel mundiore ſul‘phure, & argento vivo, ſuper quod natura parum, vel ‘minimum eſt operata.* And after, *Eligenda eſt ergo ‘materia, in qua eſt argentum vivum mundum, purum, ‘clarum, album & rubeum, non ad complementum per‘ductum, ſed commixtum æqualiter & proportionabili‘ter, per modum debitum cum ſulphure tali, & in ‘maſſam ſolidam congelata.*

Spec. Alchym. c. 3. p. 263, 264.

And to this agreeth the ſaying of *Paracelſus*, ſpeaking of the ſulphur of Gold. ‘*Hoc ſulphur, ſi quale in ‘aurifera arbore, & ad hujus radicem in montibus eſt, ‘Alchymiſtæ invenire & adipiſci poſſent, eſſet certe, ‘de quo effuſe gauderent.*

De Mineral. l. Tract. 1. p. 347.

From all which it is manifeſt that common Gold as it is perfected by Nature, and digeſted to the height of maturity, though it have never been melted, nor felt the force of the fire; yet in reſpect of the Philoſophers firſt work, is but dead, and wants the principles of life and vegetability, that neceſſarily is required to their purpoſe; and that there is another gold not vulgarly known for ſuch, in which Nature hath but wrought her firſt operations, which above all other they perſuade to ſeek after, and to take. Therefore we will conclude this (becauſe we have ſpoken more largely where we treated of Gold according to the myſtical Authors) with the advice of *Johannes Spagnetus*, who ſaith, ‘Now thoſe bodies muſt be ‘taken which are of an unſpotted, and incorrupt vir‘ginity, ſuch as have life and ſpirits in them, not ex‘tinct as thoſe that are handled of the vulgar; for

Arcan Herm. p. 175.

'who can expect life from dead things? and thoſe 'are called corrupt, which have ſuffered copulation; 'thoſe dead and extinct, which (by the enforcements 'of the chief Tyrant of the World) have poured out 'their ſoul with their blood by martyrdom.

2. In the next place many do imagine and urge, that though common Gold be dead, as Nature hath produced it; yet it is to be reviſed by Art, and that herein lies the great difficulty and myſtery of their ſolution, and the bringing of it back to its firſt matter. Of this there is enough ſaid to encourage this opinion.

We ſhall be a little large in handling this, becauſe it is a deep and myſterious point. And in the firſt place, we ſhall find all the Philoſophers as it were unanimouſly agreeing, that the tranſmutation of Metals is impoſſible, unleſs they be reduced *in materiam ſuam primam*: which we ſhall take to be granted as a certain truth, but all the difficulty lies in the true underſtanding of the Philoſophers meaning, who never ſpeak more truly then when darkly; nor never more equivocally (if not falſly) when they ſpeak plainly. Some underſtand this reduction of them into their firſt matter, to be taken to be brought to paſs in projection; of which we ſhall ſay nothing. Others, that it is to be underſtood of their firſt matter, that it muſt be by ſolution reduced into its firſt principles, of which it was conſtituted; and this in a ſober and limited ſenſe we ſhall allow of, and inquire what firſt matter it is that they muſt be reduced into; and that cannot be underſtood truly and properly of the firſt matter of Metals, for that is vapour. For *Sendivogius* tells us; '*Sciant ergo doctrinæ filii ſperma metal-* '*lorum*

No. Lum. Chym. Tract. 4. p. 312.

‘*lorum diverſum non eſſe à ſpermate rerum omnium, ſcilicet vaporem humidum; ideo fruſtra quærunt artiſtæ metallorum reductionem in materiam primam, quæ tantum vapor. Philoſophi non talem intellexerunt materiam primam, ſed tantum materiam ſecundam.* So that rationally it muſt be thought to be that which is the next and proxime matter of Metals, which *Treviſan* excellently deſcribeth thus: ‘*Glorientur Alchymiſtæ utut volent, nunquam formas tranſmutabunt metallorum, niſi per ipſorum in primam materiam reductionem: hoc ipſum habent omnes libri qui de forma tractant metallica. Verum ut intelligatur quid ſibi velit in primam reductio materiam, apprime ſciendum materiam eſſe primam, rem ipſam in quam immediate proximeque ſpecifica forma introducitur, uti prima hominis materia, eſt utrumque viri ſeminis & mulieris.* So that it being granted that there is a neceſſity of reducing the Metals into their firſt, which was the next matter into which the ſpecifick form is introduced, and thoſe that ſuppoſe natural gold, though having not felt the fire, is to be reduced into this proxime matter, which they ſuppoſe to be done by their ſolution; which is accounted ſo hard and difficult: we ſhall now examine whether common gold can be reduced into this proxime or firſt matter, which we ſuppoſe ſimply impoſſible.

Theatr. Chym. p.758.

And firſt, whereas they alledge that their ſolution is ſo extream hard and difficult, we ſhall oppoſe the authority of *Sendivogius*, who ſaith; *Et hoc vobis dico, quod opus eſt rem quærere aliquam, quæ occulta eſt, ex qua fit (miro modo) talis humiditas, quæ aurum ſine violentia ſeu ſtrepitu ſolvit, imo ita ſuaviter & naturaliter, ſicuti glacies aquæ calidæ beneficio liqueſcit,*

No. Lum. Chym. Ænig. p.351.

‘ *queſcit, ſi hoc inveniſtis, habetis rem, ex qua aurum à*
‘ *natura productum eſt : & quamvis omnia metalla, &*
‘ *res omnes ex illa ortum habeant, nil tamen ita amicatur*
‘ *ei, ſicut aurum, nam aliis rebus adhæret impuritas ;*
‘ *auro autem nulla, propterea inſtar matri eſt ipſi.* From whence I ſhall commend theſe conſiderations unto the ſtudious Reader.

1. That this matter forth of which is drawn their great ſolvent, is a thing that is occult and hid, which humidity is made forth of it in a wonderful manner.

2. That this Water doth diſſolve Gold without violence or noiſe, as pleaſantly and naturally as Ice is melted in warm water ; ſo that the water once had, the diſſolution is eaſie ; and therefore what difficulty ſoever they ſpeak of in their ſolution, muſt be underſtood of the preparing and attaining of this ſolvent, and not in regard of the ſolution of Gold in it.

3. I ſhall commend it to be inquired of by all curious perſons, whether this Gold that is ſo eaſily diſſolved in it be common Gold, or that of the Philoſophers ; becauſe I cannot determine it here, for reaſons not fit to be divulged.

4. Eſpecially to mark that this water is that from which Gold by Nature is produced ; ſo that there is a ſubject to be had, from whence Gold by Nature is produced, forth of which this their ſolvent is made and prepared ; which is a clearer hint then I know that any other Author hath ever given ; and therefore I wiſh every true Artiſt to conſider, and ponder of it well ; for this is the Key of all their ſecrets, and onely can open the door into the Philoſophers Roſary.

5. To note, that whereas he ſaith, That although all Metals, and all things have their off-ſpring from this water, yet nothing is ſo amicable unto it as Gold, becauſe other things have impurities, but that Gold hath none, which muſt be taken with a grain of ſalt; for there is no natural or common Gold but it hath ſome impurity; and in what reſpect all Metals, and all things have their riſe from it, muſt be carefully conſidered, calling to mind that this Author (as well as others) uſeth contradictions in his Writings, and tells us that the Roſe is not found without its prickles.

Poteſt. Medic. p. 474.

To this of *Sendivogius* we ſhall ſubjoyn that of *Helmont*: ‘*Summus autem atque feliciſſimus ſalium eſt, qui ultimam puritatis & ſubtilitatis metam in natura attigit, cuncta pervadit, ſoluſque agendo manet immutabilis, quæque alia pro lubitu, prompta reſolvit obedientia, rebellemque omnem materiam, non ſecus atque aqua calida nivem liquat, & volatizat.* And in another place he ſaith: ‘*Quæ longe clarius per Adeptos demonſtrari poſſunt. Quibus ſcilicet unicus & idem liquor Alkaheſt, omnia totius univerſi corpora tangibilia perfecte reducit in vitam eorundem primam, abſque ulla ſui mutatione, viriumque diminutione. A ſolo autem ſuo compari, ſubter jugum trahitur, atque permutatur.*

Ignor. Act. Regim. p. 334.

From whence we may obſerve: 1. That this liquor muſt in all probability be the ſame ſpecifically with that ſolvent of *Sendivogius*, becauſe they work the ſame effects, of which we ſhall ſay more anon.

2. We are to note that the ſubject out of which this great liquor or ſolvent is drawn, is a Salt, and that the chiefeſt, and moſt happy of Salts. But I ſhould caution every learned Artiſt, or Searcher of theſe ſe-

crets, to take care that he miſtake not (as many that thought themſelves learned, and of piercing wits, have been) who, miſled by many paſſages in the Philoſophers Writings, have been drawn forth to rome after ſome univerſal or catholick Salt, gotten forth of the beams of the Sun, Air, or ſome Earths, or carried after the fanſie of ſome other more common and vulgar Salts; but ſhall wiſh them to remember a ſaying often reiterated by the Philoſophers, which is this; *Qui habet Sal metallorum, habet lapis antiquorum*; a ſentence of few words, but of a vaſt depth, rightly to underſtand and find the true meaning of; and which ſome that I have known that have many years read and ſtudied the Philoſophers books, never could rightly dive into. But *verbum ſat ſapienti.*

3. That this liquor of *Helmonts*, like the other, did perfectly reduce, or diſſolve all tangible bodies of the Univerſe (of which common Gold is one) into their firſt life, as eaſily as Snow is volatized and melted in warm water, without any mutation or diminution of its own ſtrength, but remained immutable.

4. But that it was drawn under the yoke, and throughly changed by its onely compeer; which what that is, we ſhall plainly tell the Reader in general, that it is the Philoſophers incombuſtible ſulphur, fixed grain, or firſt agent, which we hope no man will think that we ſhould particularly name. The ſeal of *Hermes* ought not to be broken.

Though theſe two places of theſe Authors are ſufficiently concordant, as to the eaſineſs of the radical diſſolution of bodies by this liquor once had, and obtained; yet we ſhall give them another hint from this great Adeptiſt *Helmont*, that ſeems diſagreeing to what hath been ſaid, in regard of the difficulty of diſſolving ſome bodies, and yet make it appear that they are reconcileable; for though the Philoſophers ſpoke often darkly, yet they ſpoke truly; and how diſſonant ſoever they ſeemed in words, notwithſtanding there was a perfect Harmony in their meanings: And thus *Helmont* ſpeaketh concerning metallick Mercury; ‘*Siquidem in mercurio deprehendi quoddam ſulphur* ‘*externum, originale metalli labem continens. Quæ* ‘*quia originalis, ideo & difficulter ab eo tollitur. Qua* ‘*tandem nihilominus per artem ſeparata, aiunt periti,* ‘*mercurium ſuperfluo ſulphure, & humido ſuperfluo* ‘*mundatum.* From whence it is manifeſt how hard and difficult it is to ſeparate the external ſulphur from metallick Mercury, becauſe they were originally conjoyned, but that nevertheleſs by Art they may be ſeparated. And ſuch an Artiſt he calls *Peritus*, which doth manifeſt in part, that the difficulty lies chiefly in preparing and obtaining the ſolvent, and not in ſeparating the ſulphur from the metallick Mercury, when the liquor is once had. For where he is ſpeaking of the *Ludus*, he ſaith; *Eſt autem hoc opus longe difficillimum, non quidem quoad præparationem Ludi; ſed ipſius Alkaheſt.* By which it is plain beyond exception, that the preparing of this great ſolvent, is of all other far moſt difficult, and not in diſſolving any other bodies by it when it is once had: and therefore in another place, ſpeaking of the *Alkaheſt*, he ſaith it is *tædioſiſſimæ præparationis.*

Progym. Met. p. 70.

The next thing concerning this queſtion in hand, is firſt one place in *Sendivogius* that ſeemeth to favour this Opinion, that common Gold is to be uſed in the firſt Work, and that is where *Sendivogius* ſaith:

No. Lum. Chym. Tract. 10. p. 330.

'*Lapis Philoſophorum ſeu tinctura, nihil aliud eſt, 'quam aurum in ſupremum digeſtum, nam aurum vulgi eſt ſicuti herba ſine ſemine, quando matureſcit producit ſemen, ſic aurum quando matureſcit, dat ſemen 'ſeu Tincturam.* By which any one would think that vulgar Gold ought to be taken in the beginning, and ſo long concocted and digeſted until it be ripened, and then it yields ſeed or the Tincture. But if we conſider more narrowly we may obſerve, that though it be true that common Gold muſt be ripened, ere it yield the golden ſeed or tincture by which other Gold may be produced, and inferiour or imperfect Metals be changed into the nature of Gold; yet the queſtion is ſtill, whether common Gold be onely ripened by being joyned in fermentation with the Philoſophers ſulphur firſt had and prepared, that doth maturate and ripen it, or not; for it is known that the Philoſophers ſulphur being prepared, is univerſal and catholick, and would work upon Vegetables or Animals, as well as Metals; and is only determined and ſpecificated by that Metal that is joyned with it in fermentation, thereby cauſing it to tranſmute others into its own ſpecifical nature; and therefore it is credibly written of *Kelley*, that he tranſmuted Gold into Quickſilver; and this was it that made *Lully* cry out and ſay, *Is Nature alſo retrograde?* But to confirm this, let us give ſome Authorities.

Arc. Herm. p. 188.

Spagnetus telling the qualities of the Planet *Mercury*, concludeth thus; 'The like this uncertain *Elixir* 'worketh, for that being tied to no proper quality, it 'embraceth the quality, and diſpoſition of the thing 'wherewith it is mixed, and wonderfully multiplieth 'the virtues and qualities thereof.

Petrus

Hydrogr. Spag. l. 3. c. 14. p. 250.

Petrus Johannes Faber, who (as is credibly thought, and may be known in part by ſome of his laſt Writings) became a Maſter of the grand Secret, ſpeaks (in this point) thus plainly and roundly. '*Omnes fere Philoſophi Spagyrici aſſerunt fontem Chymicorum ſeu Mercurium Philoſophorum perfici non poſſe ſine auro vel argento: ſed aurum illud, non eſt aurum vulgi, nec argentum illud eſt argentum vulgi: Sed eſt quid aliud, à fonte ipſo non alienum nec extrinſecum; imo eſt aurum & argentum in ipſis viſceribus ipſius fontis enatum: Et eſt pars fixa ipſius fontis, quæ cum in duplici ſit differentia, rubea & alba; rubea quæ eſt, aurum eſt Philoſophorum, & quæ alba eſt, argentum eſt eorundem; veriſſimum eſt ſine auro illo & argento, fontem Chymicum perfici non poſſe.*

And a little after he ſaith, *De auro autem vulgi* 'nullo pacto hoc eſt cenſendum, quia quamvis in fermentatione lapidis noſtri, ſit neceſſarium ut determinetur lapis ad perfectionem metallorum: non tamen determinat perfectionem lapidis, imo contra lapis noſter terminat ac perficit aurum vulgi, ſine ipſo enim lapide, aurum vulgi mortuum omnino eſt, ac ſterile & infœcundum; cum lapide vero connexum, fit vivum & fœcundum, communicans ſuas perfectiones & dotes: unde perficitur aurum vulgi ab ipſo lapide, non è contra, ab auro perficitur lapis.* Ut ſupra.

The laſt we ſhall add to this particular, is the teſtimony of learned *Mayerus*, who ſaith: '*Nihilominus Philoſophi affirmant, ut in igne ignificandi principium extat, ſic in auro aurificandi: verum tinctura quæritur, cujus medio aurum fiat. Hæc indaganda eſt in ſuis propriis principiis, non in alienis: nam ſi ignis ignem producat, pyrus pyrum, equus equum, tum plum-*

'*bum & non argentum, aurum aurum, & non tincturam* '*generabit: Ad hæc aurum Philoſophis plumbum, pro*- '*prium eſt, quod non negant pro fermento in fine operis* '*lapidi aurifico adjici debere, ſed neceſſario requiri quoq;* '*aſſerunt. Cum fermentum ducat fermentatum in ſui* '*naturam, ſine quo tota compoſitio ad perfectionem nun*- '*quam rediret.*

Chryſop. l. 1 p. 203.

By this may be clearly opened that of *Augurellus*, which ſo many have miſtaken, and ſo few rightly underſtood; to wit,

Theatr. Chym. Vol 3.

Hordea cui cordi demum ſerit hordea: ne tu
Nunc aliunde pares auri primordia, in auro
Semina ſunt auri, quamvis abſtruſa recedant
Longius, & multo nobis quærenda labore.

Beſides what we have already ſaid, we ſhall now ſhew two irrefragable arguments that common Gold, whether having felt the force of the fire, or not, is no ingredient in the firſt work for the Philoſophers tincture.

De Lithiaſ. c. 8. p. 69.

1. And firſt *Helmont* lays it down for a firm ground of truth (which alſo all knowing Mineraliſts underſtand to be a certain verity) thus: *Quia prout nullum ſulphur, (id eſt, externum ſulphur) eſt metallum: ita omnis mercurius metallicus, eſt verum metallum.* And then ſpeaking of Copper after the external ſulphur be ſeparated from it, he ſaith; *In propoſitis autem cupri* '*terminis, contemplare internum illud, quod in albo,* '*anonymo, ac mercuriali metallo, corpus fixat, ſive coa*- '*gulat, efficitque ſub malleo ductile: cum alias mercu*- '*rius abſque ſulphure nunquam in metallum coagulari* '*poſſit.*

And after, where he is ſpeaking of metallick Mercury, which containeth its combuſtible and inſeparable ſulphur within it, he ſaith; *Si non vidiſſem argen-*
‘*tum vivum eludere quamcunque artificum operam,*
‘*adeo quod aut totum avolet adhuc integrum, aut totum*
‘*in igne permaneat, atque utrolibet modo, ſervet*
‘*impermutabilem ſui ac primitivam identitatem, i-*
‘*dentitatiſque homogeneitatem anaticam: dicerem*
‘*artem non eſſe veram, quæ vera eſt, ſine men-*
‘*dacio, atque longe veriſſimâ. Adeo ut quod ſupra eſt,*
‘*eſt ſicut quod eſt infra, & viciſſim. Ignaros ergo ſe*
‘*rei metallicæ produnt, quotquot docent præfatas mer-*
‘*curii aurique metamorphoſes.*

Ut ſupr. c. 8. p. 70.

And further; *Imo licet aurum radicaliter in partes*
‘*heterogeneas, ſalem ſcilicet, ſulphur, ac mercurium*
‘*ſe pateretur ſequeſtrari (quod nullatenus naturæ, niſi*
‘*per unicum liquorem conſtructivum, eſt poſſibile) Iſtud*
‘*tamen in mercurii homogeneitate, eſt naturæ & arti*
‘*impoſſibile. Quippe qui auro eſt ſimplicior, majori*
‘*anaticaque identitate conſtructus.*

From whence we may obſerve; 1. That metallick Mercury doth either altogether abide in the fire, or altogether flie from, and both ways remains immutable. And this *Helmont* had ſeen in experience.

2. That they are ignorant of the nature of Metals, that teach the change of Mercury or Gold.

3. That Gold may be radically ſeparated into Salt, Sulphur, and Mercury; but not poſſible to Nature to be done but by one onely conſtructive liquor.

4. But laſtly, That this in the homogeneity of Mercury, is impoſſible to Nature, and Art. And in another place he tells us: ‘*Aqua itaque, eſt interno*

metal-

Progym. Mer. p. 68. *lorum Mecurio ſimillima, qui cum omni prorſus metallici ſulphuris labe, jam eſt exutus, tam ſibi undequaque indiſſolubili nexu cohæret, ut radicaliter omnem diviſionem, arte aut natura poſſibilem, reſpuat.*

And further he ſaith; ‘*Mercurius ergo originali labe mundatus, atque virgo, non ſinit ſe amplius à ſulphuribus, aut ſeminibus apprehendi, quin hæc confeſtim conſumat, ac velut conficiat, excepto ſuo compari. Sunt namque alia ſublunaria, nimis debilia, ut tanti mercurium, ſubigant, penetrent, commutent, aut defœdent.*

Ibid. p 70. And further ſaith; ‘*Mercurius ergo de mercurio vel in mercurio, ſoſpes manet, tam ignibus, quam liquore acri. Alioqui ſi corroſiva, illum mercurium attingeret, forte multorum labor compenſaretur. Quippe tota radix, tranſmutationum eſt in ſulphure. Vid. Tria prim. p.*408.

So that the force of the Arguments lies thus: That though metallick Mercury by compoſition, and marriage with metallick Sulphurs, be made a Metal, and this may be deſtroyed by reaſon of the duality of its ſulphur; yet the mercury of that Metal is not to be deſtroyed. And if the mercury of Metals when ſeparated from its external ſulphur, be not to be changed either by Art or Nature, but onely by its compeer, which is the Tincture already prepared, then it muſt neceſſarily follow, that common Gold canno be an ingredient in the work of the Elixir before fermentation; which was the thing we undertook to prove. Nay further, either the Art of tranſmutation of Metals is falſe, or elſe metallick mercury is indiviſible, for if it were diviſible, it would be utterly

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unfit for the work in the particular of projection.

And if they ſuppoſe that the *Alkaheſt*, conſtructive liquor, or univerſal *menſtruum*, which we grant is able to ſeparate the external ſulphur from Metals; nay, even from Gold it ſelf, were able to divide, change or overcome metallick Mercury, when ſeparated from its external ſulphur, they flatly argue againſt the plain aſſertion of our Author *Helmont*, who denies it to be poſſible either by Art or Nature. And it is the unanimous affirmation of all the Maſters, that in their firſt work, their Water is the Patient, and their fixed grain, or Sulphur their Agent, that doth work upon it, overcome, and coagulate it.

And if they urge the Authority of *Paracelſus* and *Helmont*, the former of which ſaith: *Auro enim quatenus aurum eſt, corroſivum præſtat, & citra corroſivum mortuum eſt.* And the latter ſaith, *Senſi ergo, aurum abſque corroſivo ſuo proprio, eſſe mortuum: mortuum inquam, niſi radicaliter à ſuo corroſivo penetretur.* Suppoſing by this, that Gold though dead, as it is digged forth of the earth, or melted in fire, doth yet become alive, and quickned by it its proper corroſive, or their *menſtruum*, ſo that it thereby hath gotten a vegetative and generative power, and therefore is moſt fit for the firſt work. In which opinion they may be confirmed by many good Authors, if they be underſtood according to the letter. But they muſt excuſe us if we be not of their judgment, for we ſhall eaſily grant that Gold is ſhut up and dead in reſpect of yielding any remedies to cure diſeaſes withal, except it be opened and looſed with their onely conſtructive liquor, which ſeparates its ſulphur and ſalt, in which doth lie the medical virtue (as we ſhall ſhew

De vit. long. l.3.c.3.

Pot. Medic. p. 480.

more at large anon) but notwithſtanding the mercurial part of it remains indiviſible, and cannot be changed by the power of that liquor, nor by no ſublunary except its compeer. But take a full anſwer from the ſaid Authors, who (whatſoever any may think) did not in ſo main a point contradict themſelves, but did harmoniouſly agree.

Butler p.594. For *Helmont* tells us; ‘ *Profecto, metallica corpora, juxta ſuos mercurios clauſa ſunt ſigillo anaticæ homogeneitatis aqualiter: Sed ſulphura eorum nequaquam nobis indignata, colloquia prabent, modo familiaria reddantur.*

And further he ſaith, ‘ *Attamen mercurius illius metalli manet indeſtuctibilis. Hinc Paracelſus in vexatione præfata: etſi metallum deſtruxeris decies millies: attamen à deſtructionibus ſemper reſurget longe perfectius. Et in Archidoxis lib. de ſeparat. elementorum cap. de Metallis unumquodque Elementorum in ſpecie olei deſtructionis metallicæ, poteſt reduci iterum, in metallum album, priſtinum & malleabile, excepto elemento ignis, quod tincturam ſive ſulphur continet.* Tria prim. p. 408.

From whence we may note, 1. That all Metals in reſpect of their Mercuries are equally ſhut up and ſealed with the ſeal of anatical homogeneity; ſo that their Mercuries do yield us no Medicines, however wrought upon by their conſtructive liquors, but their Salts and Sulphurs do hearken unto us, if rendred familiar, and ſeparated with that grand and univerſal ſolvent.

2. That the Mercury of thoſe Metals remains indeſtructible, and not to be changed from a metallick form, or precipitated; but if they be never ſo oft de-

ſtroyed, they will ariſe more perfect then before.

3. And that the Sulphurs and Salts (in which onely conſiſts the Medical virtue) may (but doubtleſs not without their great ſolvent) be ſeparated from their Mercurial bodies, which all remain white after their Sulphurs and Salts be ſeparated from them; which white bodies may again be reduced into Anonymous Metals: of which *Paracelſus* ſaith thus much. *Tandem aſcendent obſcuri duo colores, unus albus, alter vero juxta metalli naturam, & conditionem.* Archidox. l.4. p.13 13. And after again, *Album vero ſi reduxeris, habebis inde malleabile corpus album & metallicum, quod cognoſci nequit ſub qua ſpecie contineatur.*

From whence note, 1. That he there nameth water wherein the Metals muſt be diſſolved and putrefied, but according to his uſual cuſtom doth tacitely omit to declare what kind of water it ſhould be; when doubtleſs according to *Helmont*, and truth it ſelf, it was their conſtructive liquor or *Alkaheſt*; for nothing elſe would radically diſſolve Metals, and that not without a prævious digeſtion or putrefaction. For *Helmont* De Lithiaſ. c. 4. p.33,34. tells us, ‘*In aliis vero liquorum activitatibus, corpus* ‘*nunquam poteſt ſe radicaliter commiſcere liquori ſol-* ‘*venti. Ideoque corroditur quidem, at non ſolvitur* ‘*intime, uti ad transformationem formalem alioqui re-* ‘*quiritur.*

And a little after, *Itaque terreum corpus, ſive diſſol-* ‘*vatur per corroſivum, ſive non, priſtinum ſuum eſſe* ‘*ſervat. Eo quod iſtud diſſolvens non penetret diſſolu-* ‘*tum, in radicali vinculo connexionis. Quod tamen* ‘*in tranſmutandis eſſentialibus, eſt per neceſſarium.* ‘*Diſcant ergo Chymiæ Tyrones, quod corpora non re-* ‘*ſolvantur per corroſivorum calcinationes. Licet etiam* ‘*ſæpe repetitas: niſi intercurrat fermentalis impreſſio, per putrefactionem, quæ præcedit quamlibet radicalem ſolutionem.*

2. That the mercury of the Metals, as well as their Salts and Sulphurs, are brought over the helm, and that the white may be reduced into a metallick malleable white body, which cannot be known under what ſpecies it falleth.

3. That in theſe Salts or Sulphurs the medical virtue lies hid, and that they are coloured according to the ſeveral Metals from whence they proceed. As thus: *Ex Sole vel auro ſpadiceum, ex Luna lazurium, ex Marte rubeum & valde obſcurum, ex Mercurio album, ex Saturno lividum atque plumbeum, ex Venere viride prorſus, ex Jove flavum.* And theſe in the bottom, the ☿ being at the top.

Tria prim. p. 408.

2. The ſecond Argument that I ſhall uſe, ariſeth from that immovable Axiom that the Adeptiſts have laid down, and is ſo ſtrongly, and pertinently proſecuted by *Helmont*: which is that: *Facilius eſt aurum* ‘*conſtruere, quam deſtruere:* Alſo *quod ſit longe facilius, aurum ex non auro conſtruere, quam aurum naturale deſtruere.* And another ſaith; ‘*Qui aurum ſcit deſtruere, ita quod amplius non ſit aurum, is ad maximum arcanum pervenit.* And another ſaith, ‘*Qui auri deſtructionem ignorat, conſtructionem ejus ex curſu naturæ neceſſario habet ignorare. Facilius itaque eſt aurum conſtruere quam deſtruere.* To theſe add that of *Geber*: ‘*Attentaverunt forte, quod ſit fortis compoſitionis, ſed quam fortis compoſitionis ſit, non attentaverunt.* We ſhall onely urge *Helmonts* concluſion from the two former, and leave the myſtery and ſeeming contradictions in the

De Lithiaſ. c. 8. p. 70.

Theatr. Chym. p. 828.

Art. aurif Roſar. p. 152.

Sum. perf. c. 31. p. 42.

the reſt, becauſe we intend but that onely point, and he concludeth thus. *Quotquot ergo promittunt auri ‘vel mercurii ſeparationes, nec tamen aurum peculioſa quantitate conſtruere ſciunt, cum neſciant, quod eſt longe facilius, credant etiam ſe neſcire, quod longe eſt adhuc difficilius. Ideo Bacon, inquirens primam artis materiam, perque omnia mundi corpora diſcurrens, negat aurum & argentum, eſſe materiam artis: eo quod ſit plane impoſsibilis eorundem reductio in ſulphur & argentum vivum, unde fiat filius ignis tantus in amore Philoſophorum.* And ſo finally urgeth that, That either the Adeptiſts do lie and are deceived, or themſelves the young Writers in Chymiſtry.

Tria prim. p. 408.

De Lithiaſ. c. 8. p. 70.

So we ſhall cloſe this point (wherein we have been ſo tedious) with a few Authorities of the beſt Philoſophers.

1. And firſt that of the learned Author of the *Tractatus aureus*; who ſaith, *Verum benevolus lector ‘informatus ſit, quod metalla, utpote aurum & argentum, in forma ſua metallica, materia noſtri lapidis non fuit: medium autem ſunt inter noſtram materiam, & perfecta metalla, quemadmodum noſtra materia medium eſt inter illa, & magnum noſtrum lapidem.*

Muſ. Herm. p. 45, 46.

2. To the ſame purpoſe is that of *Lully*, who ſaith, ‘*Et ideo bonus artiſta capit metalla pro mediis in opere magiſterii, & ſpecialiter ſolem & lunam. Ideo, quia illa duo venerunt in coequalitate temperata, & multum depurata de ſulphuris & argenti vivi ſubſtantia, cocta pura, & bene digeſta ingenio naturæ, ad quam proportionem Artiſta in vanum ſe vexaret, ſi à principiis naturalibus, ſine realibus mediis pro intentione faciendi velit incipere.* To which add what is quoted forth of his Codicil: where he ſaith, *Sine illis duobus,*

Teſt. Theor. c. 56.

Theatr. Chym. vol. 4. p. 94.

Muſ. Herm p. 46.

‘*duobus, auro & argento videlicet, ars iſta perfecta fieri nequit, quam hac in re puriſſima ſulphuris ſubſtantia ſit, quam natura plenarie purificavit: ad quam purificationem perveniendi ars multo eſt debilior, quam natura, ad quam tamen pervenire nequit, etiamſi in eo maxumopere deſudet.*

Art. Aurif. p. 140.141.

3. This alſo is a moſt remarkable paſſage: *Ex hoc* ‘*patet, quod aurum Philoſophorum, non eſt aurum vulgi, nec in colore, nec in ſubſtantia.* So that if not either in colour or ſubſtance, it muſt be another thing; which is to be noted.

Theatr. Chym. vol. 1. p. 757.

4. That of *Treviſan* is carefully to be weighed and conſidered; who after he hath perſuaded us to leave Alloms, Vitriols, Salts, and the like; and Animals, and all that proceeds from them; and all Minerals, and the Metals alone. For although from them there be an entrance, and that their matter ought to be compounded of Argent vive, as all Philoſophers affirm; and that this is no where elſe to be found but in the Metals, as appeareth by many teſtimonies there cited; and that by them all, it is affirmed that Metals are nothing elſe but Argent vive, congealed by gradual decoctions; yet he concludeth thus: ‘*Hic non obſtantibus omnibus affirmativis rationibus, ipſa (ſcilicet metalla) non ſunt lapis noſter, dum in forma ſunt metallica: nam impoſſibile eſt unam & eandem materiam habere duas formas.* From whence, if it be a truth that *Helmont* holdeth forth, That metallick Mercury can be changed by no ſublunary Agent, except its compeer, but that ſtill it will remain a Metal not to be altered from that ſtate either by Art or Nature: then ſeeing that it immortally and immutably remains in its metallick form, except changed by its compeer,

which we aſſert to be the tincture already prepared, then of neceſſity it cannot be an ingredient in the firſt work, which was that we undertook to make good.

Muſ.Herm. p. 222,223. 5. I ſhall onely give two Authorities in this particular, and ſo conclude. One is this by *Johannes Mehung*; who ſaith, *Aurum itaque ex mineralibus optimum eſſe mihi haud ignotum eſt: nihilominus tamen neque in forma, neque materia, ad perfectionem ſuam tranſgrediendam, ullam aliquam habet efficaciam. Nullam ſiquidem majorem operationem habet, ut amplius aliquid, quam ſeipſum, perficiat, qualem qualem etiam artem homo huic adhibeat. Si quis enim affirmare conaretur, quod reſerandum, & in argentum vivum redigendum illud eſſet, is hac in re plus juſto ſtulteſceret, cum ex auro nihil amplius, quam quod in eo eſt elicere poſsit.* And a little after: *Imo adhuc amplius affirmo, quod deſtruere, conficiendi auri, minime via ſit.* The other for brevity ſake I commend to be conſidered of by the Reader, where he may find it at large in the *Via Veritatis unicæ*, in the *Muſæum Hermeticum*, p. 266,267.

Now what clear light I have brought in this particular to the dark places in *Paracelſus*, *Helmont*, and the reſt, will be known unto thoſe that have thorowly ſtudied their Writings, and do ſolidly underſtand them. And I hope that divine Providence will be pleaſed to open theſe Myſteries to the meek and lowly, and keep them ſtill veiled from the proud and wicked.

2. The next thing we propoſed to handle, is concerning *Aurum potabile* and the Tincture of Gold; which may be much cleared by what we have here ſpoken in this Chapter, and by ſome things that we

have before mentioned, though upon another occaſion. But to open it more largely, we ſhall draw ſome particulars from what hath been ſpoken, and add ſome more weighty conſiderations.

Chryſ. paſſim, p.192. Id. Sept. Plan. Terreſtr. p.162.

1. *Angelus Sala*, a laborious, learned and honeſt Chymiſt, writ a Treatiſe of common Gold, therein labouring ſtrenuouſly to prove that it cannot by Art be brought into ſuch a condition, as may be properly ſaid to be potable, in either of thoſe acceptations; as either Oyl or Water, which of themſelves are liquid, nor as Salts, which though of themſelves neither liquid nor potable, yet infuſed in any moiſt and liquid ſubſtance, will then become potable. But this he meaneth, that though its body may be divided into ſuch ſmall atoms, or particles, that mixed with wine or ſome other liquor, and ſo give it another colour, or a new tincture, yet that it is not thereby radically diſſolved, but may again be reduced into the metallick form of Gold, of which he giveth many clear and learned inſtances. Thus far this Author (according to what he knew) hath ſaid right, and ſo much is confirmed by *Helmont*, who not onely granteth that common gold may be reduced into a light-red coloured oyl, but alſo teacheth the open and plain proceſs thereof. Yet after all concludeth that it is reducible into metallick Gold again, in theſe words: *Eſt enim*
‘ *ſumme levigatum, imo & durum, ſolidum, malleabile,*
‘ *ac fixiſſimum corpus, quod jam in naturam verſum*
‘ *videtur. At ſane mentitus ille liquor, in priſtinum*
‘ *auri pondus, & corpus, facile redigitur.* And again,
‘ *Etenim poſtquam ſcivi corpora denodare, per conſen-*
‘ *tanea ſuis principiis radicalibus: tum primum cæpi,*
‘ *cum ſalutari tædio, irridere, ſtolidas credulitates meas,*
quibus

Progym. Met. p.68.

Pot. Medic. p. 480.

‘ *quibus olim aurum diſſolvi : ejus tamen potabili ſucco* ‘ *minus profeci, quam ſimplicis alicujus decocto. Deinceps vero potui aurum diſſolvere, butyri, reſinæ, atque vitrioli facie ludere. At nuſquam inveni virtutes auro tributas, eo quod noſtris ſic etiam fermentis* ‘ *reluctaretur.* And in ſome other places he hath things to the ſame purpoſe ; from whence we ſhall commend theſe particulars to be noted.

1. That common Gold may by vulgar Chymiſtry be brought into the form of a light red-coloured oyl, but that not profitable at all in medicinal vertue, and may eaſily be again reduced into the fixt and malleable body of Gold ; and thus far onely *Sala* was experienced in, and in this reſpect onely his Arguments are good and concluſive.

2. But that notwithſtanding Gold and other Metals may be diſſolved *per conſentanea ſuis principiis radicalibus*, which thing was unknown unto *Sala* ; and therefore we may very well take notice, that concluſions drawn from the experience of one man, nay of many, will not neceſſarily infer a general rule : for *Helmont* was once ignorant of this liquor that was conſentaneous to the radical, proper principles of Gold ; and therefore for him then to have concluded generally that there was no ſuch liquor as would radically diſſolve Gold, had been falſe, ſince he knew it afterwards : and what a thouſand knows not, one that is none of them may know.

2. We have in this Chapter before ſufficiently ſhewed that the colour, tincture, or ſulphur of common Gold, may be by Art ſeparated from its body, afterwards remaining white, and an Anonymous Metal, and not to be deſtroyed by Art or Nature. But

that we may make it clear beyond all exception, we ſhall add ſome further proofs. *Helmont* tells us, ſpeaking of his *Arcanum Coralinum*, which is common Quick-ſilver fixed by the liquor *Alkaheſt*: ‘*Non etiam auri color, ſulphur, ant tinctura alvum ſubducunt.* By which he clearly grants that the colour, ſulphur, or tincture of Gold may be ſeparated from it; but that it doth not looſe the belly, or purge as the *Arcanum Coralinum* doth. And in another place he ſaith, *Quod aurum quidem ſit corporum conſtantiſſimum in igne, ſed ſuæ conſtantiam ſeparationis mutuat à mercurio: adeo ſi ſulphur ejus includat dualitatem heterogeneam; id mercurium minime attingit. Admitto quidem quod mercurius per compoſitionem tranſmutationis, & maritationem ſulphurum metallicorum; fiat metallum, & hoc ſit deſtructibile ratione dualitatis ſui ſulphuris: Attamen mercurius illius metalli manet indeſtructibilis.* From whence he implieth plainly, That common Gold and other Metals have in them an heterogeneous duality, in regard of their external ſulphurs, and that this may be ſeparated, or in reſpect of it the Metal may be deſtroyed, yet that the Mercury of that Metal is indeſtructible. And again, which may be is quoted before: ‘*Unumquodque elementorum in ſpecie olei deſtructionis metallicæ, poteſt reduci iterum in metallum album priſtinum, & malleabile excepto elemento ignis, quod tincturam ſive ſulphur continet.* Of which we have ſpoken largely before. And again to repeat ſomewhat, he ſaith: ‘*Imo licet aurum radicaliter in partes heterogeneas; ſalem ſcilicet, ſulphur, ac mercurium ſe pateretur ſequeſtrari (quod nullatenus naturæ, niſi per unicum liquorem conſtructivum eſt poſſibile) Illud ta-*

‘*men*

Lib. volup. vivent. p. 386.

Tria prim. p. 408.

Ibid.

‘ *men in mercurii homogeneitate, & naturæ & arti im*‘ *poſſibile. Quia in mercurio non eſt reperibilis di*‘ *verſitas, qualis alioqui in tinctura auri hujuſque al*‘ *bedine.* From whence it is moſt manifeſt that the ſulphur or tincture of common Gold may be ſeparated by that onely one conſtructive liquor; but that the remaining body of the metallick Mercury (which is truly a Metal, though anonymous, and not to be known under what ſpecies it falls) is impoſſible either to Art or Nature to be divided or ſeparated. And this he hath plainly ſhewed of Copper; where he ‘ declareth, *Non eſt ergo ignis veneris ſpiritus vitrioli,* ‘ *utcunque exquiſite rectificatus: ſed ignis ille eſt, ſul*‘ *phur cupri volatile, in forma olei viridis, melle dul*‘ *cius, & à corpore mercuriali ſui cupri plane ſepara*‘ *tum. Reſiduum autem cuprum manet album, nec* ‘ *unquam virideſcens per æruginem, ut neque amplius* ‘ *ex numero ſeptem metallorum. Quia evaſit notum* ‘ *atque anonymum metallum: non poteſt autem haberi* ‘ *ignis veneris, niſi cum plenaria: cupri deſtructione* ‘ *corporiſque mercurialis ipſius veneris volatilizatione.* ‘ *Quod quantumcunque ſit volatile, in forma olei: faci*‘ *li tamen negotio, poſtmodum iterum reducitur in me*‘ *tallum album ignotum, atque ſub malleo extenſibile.* ‘ *Sed ignis ſive ſulphur veneris, non item amplius redu*‘ *citur in metallum per ſe.* Which is a clear demonſtration, not onely that the ſulphurs or tinctures of Metals are by Art to be ſeparated from them, but (excepting the manifeſting of the matter and manner of the preparing of the *Alkaheſt*, which he and all other Adeptiſts are bound to conceal) alſo the way of ſeparating them, and the qualities both of thoſe ſulphurs and their mercurial parts are ſhewed. A

De Lithiaſ. c. 8. p. 69.

point of high concernment rightly to be weighed and underſtood; and it is no great marvel that ſo many frivolous, and ignorant diſputes have been, and are about *Aurum potabile*, or the tincture of Gold, which can never be truly reſolved but by him that knoweth, and is poſſeſſor of that univerſal ſolvent. Thus much more we ſhall onely add in this particular; where he ſaith: ‘ *Quoties namque à mercuriis ſales, & ſulphura* ‘ *diſtinxi, admiratus ſum illorum ignaviam, horumque* ‘ *vero principiorum dignitates.* Where again he declareth that the Salts and Sulphurs of Metals are to be divided from their Mercuries; and that the Mercuries of Metals in medical virtue (for we have ſhewed by his authority before, that the mercuries of Metals are all equally ſhut up with the ſeal of anatical homogeneity, and yield no medical vertue at all, but that their ſulphurs do hearken unto us, if rendred familiar) but did wonder at the efficacy of their Salts and Sulphurs. And from this root doth ſpring and ariſe thoſe medicaments prepared by the *Alkaheſt* (but not otherwiſe to be had) that *Paracelſus* called *Hematina*: of which *Helmont* ſaith he had taught that which was ſufficient, and therefore concludeth thus; *Quapropter ejuſmodi Hematina admirandas in re medica operationes perficiunt. Senſi ergo Hematina Solis & Lunæ, quod etiamſi ex puritate ſui balſami comfortarent: tamen aliquid alieni in ſe continere, reſpectu noſtri.* From whence we may note, that theſe Hematine medicines may be had forth of Gold and Silver; but not without the help of their conſtructive liquor, or univerſal ſolvent: and therefore (as he ſaith elſewhere) are not ordained for remedies for the Poor; and that ſcarce one Artiſt of a thouſand, can rightly get theſe rare and

Ibid c.3.p.34.

Pot. Medic. p. 479.

and excellent medicines contained in their Salts and Sulphurs, ſeparated from their Mercuries, which contain no medical efficacy at all.

3. From hence may be reſolved that great queſtion, whether common Gold may be made ſo potable, as never to be reduced again into a metallick body? To which we ſay that it plainly appeareth both by this Author and *Paracelſus*, that common Gold and Silver may by their great ſolvent be brought into an oylie ſubſtance or liquor, in two forms or colours; the Salts and Sulphurs of them according to the Metals from whence they were taken, of divers colours (which hath been ſhewed before) but the Mercuries of all the Metals in a white form or colour, which by it ſelf may be reduced into a malleable and metallick body, but their ſalts and ſulphurs never. For as no external metallick ſulphur is a Metal, ſo every metallick Mercury is really a Metal. So that if they mean by *aurum potabile*, or any other Metal, the whole ſubſtance brought into a potable liquor, and never again to be reduced into a metallick body; notwithſtanding the Arguments of ten thouſand to the contrary, we poſitively affirm with the Adeptiſts, that the mercurial part of it is always reducible into a Metal, and remains immortal and immutable, never to be divided or changed, but by its compeer. But if they mean by *aurum potabile*, or the tincture of Gold, the external ſulphur (which containeth its ſalt) ſeparated from its remaining white mercurial body (in which is contained its internal and inſeparable ſulphur, agent, or *verus ignis naturæ*) then we abſolutely affirm, that it may be brought into a condition of potability, at leaſt like ſalts to be diſſolved in liquors, and that it is never poſ-

ſible either to Art or Nature, to reduce that ſulphur or ſalt into a metallick body again; and this when the Philoſophers ſpeak of *aurum potabile* drawn forth of common Gold, is that onely which in that reſpect they truly underſtand, and the onely end they aim at. To confirm which take theſe particulars; for *Helmont* ſaith, ‘*Senſi quoque, remedia mineralia, in ſalis naturam mutata (non intelligo, quæ per adjunctum condiuntur ſalem) ſecum geſtare, ſua ſemina, in gradum tamen exaltata. Quibus etſi totum metallum reſolvatur in alienam diſpoſitionem (quæ eſt magiſterii) attamen quia exin mox mercurius currens elicitur: quicquid ſalis reſolubilis naturam vere aſſumpſit, non eſt mercurius, ſive metalli interior, & immutabilis nucleus, ſed ſaltem ſulphur ejus.* From whence it is apparent, that mineral Medicines changed into the nature of Salt, do bear their ſeminal efficacy but in an exalted degree; he doth not mean by the adjoyning of ſalts unto them, but of their own interior and ſeparable ſalt and ſulphur. And that by this their ſolvent the whole Metal is brought into another diſpoſition, (which he calls a magiſtery) from whence the mercurial part being ſeparated, that diſſoluble ſalt is not the internal and immutable kernel of the Metal, but onely its ſulphur. Therefore as he tells us in another place, A magiſtery is the total ſubſtance of a thing reduced into its primitive juice, in which retroition of ſolution, the heterogeneous juices are ſeparated on their own accord, for the moſt part with divers bottoms, ſwimming in courſe one above another, one chief remaining, or falling to the bottom, famous in diverſity containing the ſeminal entity. And this way of preparing is unknown to the vulgar Chymiſts, becauſe

Poteſt. med. p. 479.

Pharmacop. p. 461.

cauſe not to be performed, but by the liquor *Alkaheſt*, and ſuch a magiſtery is *aurum potabile*, which when the Gold is diſſolved by their liquor, *Paracelſus* tells us, that that which is white ſwimmeth above, and is the mercurial part that may be reduced into a white anonymous Metal, and that the Quinteſſence in which is the Medical vertue, remaineth in the bottom. Ibid.p 467. And of this way of preparing, take *Helmonts* caution in theſe words; ‘*Hæc medendi pars, ſolertem requirit, ac gnarum naturæ Secretarium. Quia in illa parte, ampliſſimæ medicaminum opes, & deaurata glauræ ſuppellex invenitur.* To which I ſhall onely ſubjoyn what that learned and laborious Chymiſt *Joachimus Polemann* hath taken notice of, in relation to *Paracelſus* proceſs of preparing *aurum potabile*, or the tincture of Gold, by the ſpirit of Wine; which is thus: Theatr.Chym. vol.6. p.636. ‘*Qua in re* (ſpeaking that the *Alkaheſt* is of the nature of an *Alcali) tanto magis me confirmavit annotatio Philoſophi noſtri (id eſt Helmontii) quam propria manu in margine Chirurgiæ magnæ Paracelſi*, p. 202. *in folio juxta præparationem tincturæ auri ſcripſit: ubi Paracelſus docet, ſi ſuper calcem auri alcool vini affundatur, tunc animam auri extractum iri. Hac occaſione annotatio Philoſophi noſtri hæc fuit. Niſi ſal circulatum inſit ſpiritui vini, tinctura ex auro non tranſit in eum.* And ſo enough of this particular.

4. The Philoſophers often make mention of another ſort of *aurum potabile*, or the tincture of Gold, which is not drawn forth of common Gold, but forth of another ſubject; and this we touched where we ſpake of Aſtraliſh Gold, and ſhall here again mention it more at full. Thoſe that will take the pains ſeriouſly to conſider what *Paracelſus* hath written concerning

the *Primum ens auri*, in his Book of *Renovation and Reſtauration*, and in divers other places, may (if they can underſtand that dark and ſubtile Author) find much ſatisfaction in this particular; to which we refer the ſtudious and curious ſearcher of the Secrets of Nature.

Antid.Chym. p.231.. & p.239. In the next place take what *Rhumelius*, a learned German Author, and one who doubtleſs was Maſter of the univerſal ſolvent, ſaith to this purpoſe: That all particulars whereby to obtain *aurum potabile*, or the tincture of Gold, are in vain, and fruitleſs, except by the univerſal ſolvent. And he further ſaith, Out of this ſpiritual-like matter, from whence the beginnings of Gold do grow, or ariſe, may *aurum potabile* be made, that is of more efficacy, and better then forth Ibid.p.245. of common Gold it ſelf. Again, That *aurum potabile* may be made forth of the *Primum ens vel ex auro imperfecto, vel è radice ſolis*; that is, more perfect, more Ibid.p.248. efficacious, and better then that which is made forth of common Gold it ſelf. Again he ſaith, That he did prepare two ſorts of *aurum potabile*, one forth of perfect Gold, that is, common, and perfect, fine Gold. The other *è radice ſolis*, or forth of unripe and imperfect Gold. Sometimes they call their *Elixir aurum potabile*, becauſe it will cure the moſt diſeaſes that are curable; and that it is ſprung from that root which was of a golden nature, and many things to the ſame Man. de Lap. p.138. purpoſe. For ſo *Paracelſus* having taught the compoſition of their great tincture, he ſaith; *Ex hoc enim (ex electro minerali immaturo ſcilicet) fonte ſcatet verum aurum potabile, nec melius alibi reperiri poteſt.* Ibid.p.137. And a little before, *Dico tibi autem in veritate, nullum melius fundamentum eſſe medicinæ totius, quam* *in Electro latet.* And further: *Sed in noſtro dicto Electro præparato, tanta virtus latet homines curandi, ut certior, & præſtantior medicina in toto mundo, non poſſit reperiri.* And of this, thus *Helmont. Inprimis tinctura Lili, ab Electro minerali immaturo in vinum vitæ redacta, cujus una pars metallus primus: altera vero membrorum eſſentia. Arcan. Paracelſi, p.* 790.

5. Now we come to the laſt member of this tedious Chapter concerning the univerſal ſolvent, by *Paracelſus* firſt, and after by *Helmont* called *Alkaheſt*; about which we ſhall be brief. For we intend not here to ſpeak either of the ſubject forth of which it is prepared (which is one of the Adeptiſts greateſt ſecrets, nay indeed the onely thing that they have moſt laboured to veil and conceal, all other points of their great work being for the moſt part plainly opened, either by one of them or another, in one manner or another, in one place or another) nor of its preparation, which *Helmont* ſaith is moſt tedious, nor of its manifold names, and Epithetes, nor of the innumerable virtues of it in general, becauſe (if it pleaſe divine Providence to grant us health and life) we have ſomething in a readineſs to all thoſe purpoſes, that may come to publick view hereafter, if we can judge the World worthy of it. Onely here we ſhall ſay, that the *Alkaheſt* of *Paracelſus* and *Helmont* is the ſame ſpecifically with that univerſal ſolvent or *menſtruum* of *Sendivogius*, *Lully* and the ancient *Philoſophers*, though many may ſtumble at the bold aſſertion, and others carp, contradict, or condemn us. For we conceive we have in part ſufficiently evinced that they are parallel, by what we have ſaid in comparing the effects of *Helmont*'s *Alkaheſt* with the *Chalybeate*

water of *Sendivogius*, that they both would as eaſily diſſolve and volatilize the body of Gold, as Ice or Snow is melted in warm water; which they could not perform, if they were not both of the ſame ſpecifick nature in their effects, and operations. To which we ſhall onely add one or two Authorities more, and urge the concluſions that may be drawn from them. Lib. de Febrib. c.14 p.52. The firſt is, that of *Helmont*, where ſpeaking of the *Arcanum Corallinum*, which is prepared by drawing of the *Alkaheſt* from common vendible Quick-ſilver, which is done in one quarter of an hour: and there he quoteth *Raymund Lully*, who, his friends, and the King being preſent, did coagulate Quickſilver, and none knew the manner except the King. And ſaith, *In qua coagulatione iſtud eſt ſingulare. Quod liquor Alkaheſt, idem in numero, pondere & activitate tantum valet milleſima actione, quantum prima. Quia agit ſine reactione patientis.* And then telleth that it is to be made into ſmall powder, without any remaining part of the liquor. And to be diſtilled five times with the water drawn from the whites of Eggs, and then it is made red as Coral, and then concludeth, and ſaith; *Iſte pulvis dulcis eſt, fixus ferens omnem follium ignem, nec perit in plumbi examine. Spoliatur tamen virtute medica, dum in album metallum reducitur.* To this we Theatr. Chym. vol. 4. Theor. Lullii c. 87. p. 139. ſhall joyn the place in *Lully* hinted at by *Helmont*, who ſaith; *Et pro certo, in præſentia, & voluntate certorum ſociorum argentum vivum vulgare congelavimus, per ſuum menſtruale, & alias uni de ſociis noſtris, in cujus eramus ſocietate expreſſe, quaſi ad duas Leucas prope Neapolim, in quo loco in præſentia Phyſici regis, & unius fratris de ſancto Jo. de Rhodis, & Bernardi de la Bret, & aliorum, congelari fecimus argentum*

gentum vivum per ſuam menſtrualem naturam. Et quamvis hoc vidiſſent, & manifeſte palpaſſent, tamen non potuerunt ſcire quid eſſet, niſi ſimpliciter ſolummodo ruſtico more, regia majeſtate ſalva. Etſi realiter & Philoſophice cognoſcere potuiſſent per ſpeculationem intellectivæ virtutis dictum menſtruale ac ſuas virtutes, artem ac ſcientiam abſque dubio habuiſſent, prout dicti ſocii, qui per nos multum bene intellexerunt manifeſte, & habuerunt. Et tunc argentum vivum vulgare dimiſiſſent ad creandum lapidem, & ad exuberandam ſuam humiditatem, & ideo nos cogit ratio, quod ignoranti habeamus illud celare. From all which we may take theſe moſt remarkable obſervations. 1. That this coagulating common Quick-ſilver by two ſuch grand Maſters as were *Lully* and *Helmont*, was no vulgar knack, but a true Philoſophical work, elſe it had been unworthy the naming by two ſuch ſerious and learned perſons.

2. That *Helmont* would never have hinted at *Raymund Lully*'s coagulating common Quick-ſilver, but onely that it was to ſhew that their *menſtruum* was ſpecifically the ſame in effect and operation, otherwiſe he would not by his knowledge of the *Alkaheſt* have numbred himſelf amongſt the Adeptiſts, as he ſaith; which is more clearly demonſtrated by the Adeptiſts, *& mecum norint Adepti*, but that the knowledge and poſſeſſion of this liquor, is the onely key, and the moſt noble of all their ſecrets.

3. We may here from *Helmont* note the excellency of this liquor, that it ſtill remained the ſame in number, weight, and activity, and was as prevalent in the thouſand operation, as in the firſt: which is an admirable and ſtupendious quality.

4. We may obſerve the great energie and penetrativeneſs of this liquor, that in ſo ſhort a time as a quarter of an hour, could ſo perfectly fix, and coagulate Quick-ſilver.

5. It is as clear as the light of the Sun at noon-day, that this that *Lully* calls a menſtrual humour, was of the ſame ſpecifick nature with the liquor *Alkaheſt* of *Helmont*, becauſe they both produced the ſame real effects in fixing and coagulating common Mercury.

6. But the main thing above all the reſt, that we are here to take notice of is, That whoſoever is the Maſter, and Owner of this moſt precious liquor, hath the gates open to the Treaſure of Treaſures, even to the attainment of the great Elixir, or the Philoſophers Tincture: for *Lully* tells us faithfully and truly, that if the ſtanders by had known this menſtrual liquor really and philoſophically by the ſpeculation of an intellective power, and its virtues, they had known without doubt, and had had the Art and Science it ſelf.

7. And therefore becauſe this is the onely key that opens the Roſary of the Philoſophers, they are bound in all reaſon to hide and conceal it from the ignorant and unworthy.

8. That thoſe that know this will diſmiſs common Mercury from creating the Stone, or exuberating its humidity; ſo that common Mercury is no ingredient (as many do too vainly and ſtiffly maintain) in the compoſition of the great Elixir.

9. We may obſerve from *Helmont*, That this powder of common Quick-ſilver, when coagulated by the *Alkaheſt*, is fixt and endures all the blaſts of the bellows, neither doth periſh in the trial of Lead; and

therefore hath as great a fixation and perfection as ſilver; which is moſt ſeriouſly to be weighed and conſidered.

10. We may from hence note, That in the coagulating of common Quick-ſilver by the *Alkaheſt*, the Atomes of the homogeneous Mercury, are brought more cloſe together, and joyned *per minima*, then they were before; and the external and combuſtible Sulphur, which is leſs or more in all common Quick-ſilver, and in which is the medical virtue, is, by the radical piercing of the *Alkaheſt* the ſmalleſt particles of the Mercury protruded, and extroverted, which Sulphur is without queſtion burned or ſeparated, in fluxing down the fixed and coagulated Mercury into a white Metal, and ſo of neceſſity muſt thereby loſe its medical virtue.

We might here alſo ſay ſomething of that which they call Horizontal Gold, but a more fit place to handle it will be where we write of common Quick-ſilver: onely here we ſhall ſay a word or two concerning the compeer of their *Alkaheſt*, for *Helmont* ſaith, ſpeaking of that great liquor, and its virtues: *Quibus* 'ſcilicet unicus & idem liquor Alkaheſt, omnia totius 'univerſi corpora tangibilia, perfecte reducit in vitam 'eorundem primam, abſque ulla ſui mutatione, viriumque diminutione. A ſolo autem ſuo compari, ſubter 'jugum trahitur, atque permutatur.* Ign.Act.Reg. p.334.

From whence we may note theſe two things, 1. That its general virtue is to reduce all tangible bodies of the whole Univerſe into their firſt life, without the mutation of it ſelf, or the diminution of its virtues, which is high and wonderful.

2. But that it is brought under the yoke, and

throughly changed, onely by its compeer; and the queſtion is, what that compeer is? To which we anſwer, that as the *Alkaheſt* is the key to the knowledge of the Philoſophers great work, and is an ingredient into it; ſo that which they call their earth, fire, ſulphur, agent, king, or male, is that which doth coagulate, work upon, ſubjugate, and change this their water into that which they call their ripened or exuberated ſulphur, or tincture, before it be fermented; and this is confirmed by *Sendivogius*, who ſaith: *Primum* ‘ *reſolvetur terra in aquam, quæ mercurius Philoſo-* ‘ *phorum dicitur, & illa aqua reſolvit illa corpora So-* ‘ *lis & Lunæ, & conſumit ea, ut non remaneat niſi pars* ‘ *decima cum una parte: & hoc erit humidum radicale* ‘ *metallicum.* And *Treviſan* ſaith: *Nulla aqua natu-* ‘ *rali reductione ſpeciem metallicam diſſolvit, niſi illa* ‘ *quæ permanet cum ſpecie metalli in materia, & forma,* ‘ *& quam metalla ipſa poſſunt recongelare.*

No Lum.Chy. Tract. 11. p. 333.

Theatr. Chym. vol.1.p.832.

Chap.

CHAP. XIII.

Of the deſcription of Silver, and the ſeveral ways that the Ore of it is gotten; and of its Mines, conditions, and ſtriking paſſages.

NExt in goodneſs to Gold, Silver by all Authors is moſt eſteemed, and of it *Baſilius* ſaith thus. ‘Silver Ore is wrought in its own ſtone, of a perfect nature, and moſt noble earth, and of a fixt clear ſulphur, ſalt, and mercury; which with a mixture doth joyn in a fixt and firm uniting, and appeareth of a degree lower then the Gold is, and is the beſt Metal next to Gold; and in the fining of it loſeth very little, and is ſeparated *per ſe*, or with other Metals joyned in the fire. And of it *Acoſta* ſpeaks thus. ‘And firſt I will ſay that the reaſon why they give Silver the ſecond place among all other Metals, is, for that it approacheth nearer to Gold then any other, becauſe it is more durable, and leſs indamaged by the fire, and more malleable then any other: yea, it paſſeth Gold in brightneſs, beauty, and ſound; the which is clear and agreeable; for the colour is more conformable and reſembling the light, and the ſound more piercing, more lively, and more delicate. And the deſcription of this Metal, *Bacon*, according to the Ancients, gives thus. ‘Silver is a clean body, pure, almoſt perfect, procreated of Argent vive pure, almoſt fixed, clear and white, and of ſuch a kind of ſulphur, and to it is awanting a little fixation and colour, with weight. *Pollius* thus, Silver is a

Laſt Will and Teſt. c.4.p.86.

Nar. & Mor. Hiſt.Ind.c.5. p.216.

Spec.Alchym. c.2.p.259.

Phyſ. Herm. c.4 P 335.

‘Metal conſiſting of a white tincture, and Mercury ‘well concocted, and conſtantly coagulated. The moſt of the Ancients do in their deſcriptions agree with this of *Bacons*, and therefore needleſs here to repeat more of them. The learned *Wormius* gives this deſcription of it. ‘This perfect Metal is next unto ‘Gold, conſiſting of Mercury, and Sulphur almoſt ‘fixt, extenſible like unto Gold, but in weight lighter ‘then it, as alſo then Lead, bearing the force of the ‘fire. They gather that it doth participate more of ‘Mercury then of Sulphur, as well by the colour, as ‘the liquefaction. But an indication of Sulphur, the ‘vehemency of the odour of Sulphur, when it is fluxed and refined, to be perceived by the noſtrils. But ‘that it doth not reach the fixedneſs of Gold, is manifeſt from this, that *in cæmento Regali*, and Antimony ‘and Sulphur, ſomething of it doth periſh, and is ‘burned, when by fuſion they are mixed together. ‘And alſo when it is touched with *Aqua fortis*, or ‘ſtained with their vapours, it emits a ruſt of a blue ‘colour.

Muſ. Worm. l. 1. Sect. 3. c. 3 p. 115.

And theſe may ſeem ſufficient for deſcribing the nature and conditions of Silver, we ſhall onely add what *Paracelſus* ſaith to this particular; who, though he may be diſeſteemed with many, yet is the account that he giveth of it, as good as the beſt Author we have read; which ſtands thus. ‘Silver is generated of a ‘white Sulphur, Salt, and Mercury; which being ‘prepared moſt ſubtily, and made diaphanous, are rendred of a fixed nature; that is to ſay, they are fixed ‘of their proper nature next unto Gold, abiding in the ‘teſt by Lead, or *per cineritium*: but not in Antimony, the *cæmentum Regale*, nor in the Quartation.

Lib. de Min. Tract. 1. p. 348.

All which paſſages do fully ſhew the qualities and properties of this noble Metal, ſo that we need not ſum up the particulars.

1. Now we ſhall proceed to declare from the beſt Authors, how the Ore of Silver lies in its paſſages in the bowels of the Earth, the manner of its Coats, Matrixes, or Coverings: for though ſome little may be gathered in ſmall grains in the Rivers, and their muds and ſands waſhed by the force of waters forth of the tops or ſides of the Mountains, yet is that ſo ſeldom found, and in ſuch ſmall quantities, that Authors do write but very little thereof, and we have not attained the ſight of any of it, and therefore ſhall paſs it by. And as for our own Nation of *Great Britain*, we have not had the fortune to obtain any Ore of Silver (that we might juſtly call a Royal Mine, not to ſpeak that all Lead Ore contains ſome ſilver in it) except ſome three ſorts, two of which were pretty rich in ſilver, as containing about ſixty ſix pound in a tun, and was found in a blewiſh-grey ſtone, in ſome places intermixt with white ſpar, and the ſilver mixt with ſome Lead, appearing like white and bright grains, as ſmall almoſt as Needle points. The third which contained about twenty ſeven pound in a tun, was like that which Authors call *Galena*, or the hardeſt ſort of Lead Ore. And theſe are all that of our own experience we can inform the Reader of; and therefore ſhall paſs to what others deliver to the ſame purpoſe.

2. The diligent Obſerver *Joſephus Acoſta* gives us this account very worthy to be regarded. ‘The Mines ‘of Silver are commonly found in Mountains, and high ‘Rocks very deſart, although they have been ſometimes found in Plains, and Champaigns. There are

Hiſt Ind.c.5. p.217.

Ut ſupra p.218

Ibid.c.6.p.219

Ibid.p.223.

'two different kinds, the one they call ſtragling, the other fixed and ſetled. The ſtragling, are pieces of Metal found in certain places, the which drawn away there is no more found. But the fixed veins are thoſe which have a continuance in depth and length, like to great branches and arms of Trees; and when they find any one of them, they commonly find many in the ſame place. And further ſaith, The chief places of the *Indies* from whence they draw Silver, are *New-Spain*, and *Peru*; but the Mines of *Peru* far ſurpaſs the reſt: and amongſt all others of the World, thoſe of *Potozi*. And ſpeaking of the Mountain *Potozi*, he ſaith: The ground and ſoil of this Mountain is dry, cold, and very unpleaſant; yea altogether barren, which neither ingenders, nor brings forth any fruit, graſs, nor grain; it is naturally inhabitable, for the intemperature of the heaven, and the barrenneſs of the earth. He noteth another very remarkable paſſage, which I cannot but commend to the Reader; and is this: 'They ſay of the rich vein, the firſt that was diſcovered, that the Metal lay above the ground the height of a lance, like unto Rocks, raiſing the ſuperficies of the earth, like unto a creſt of three hundred foot long, and thirteen foot broad, and that this remained bare and uncovered by the deluge. This Vein having reſiſted the violence and force of the Water, as the hardeſt part: The Metal was ſo rich as it was half Silver, and this Vein continued in his bounty fifty or threeſcore ſtades, which is the height of a man, and then it failed.

Plin.lib 33. c.6.

3. Take this paſſage of *Pliny*, Engliſhed by the ſame *Acoſta*. 'They find Silver almoſt in all Provin-

'ces, but that of *Spain* is the beſt, which grows and 'ingenders in a barren ſoil, upon Mountains and 'Rocks. It is a certain and infallible thing, that in 'places where they have once diſcovered any of theſe 'Veins, there are others not far off, which is likewiſe 'found in all other Metals, and for this the Greeks in 'my opinion called them Metals.

Laſt Will and Teſt. c.4.p.87, 89.

4. *Baſilius Valentinus* thus deſcribeth the growing and lying of Silver in its Clifts, Rocks, Stones, Earth, and ſuch like other Coats or Coverings. 'Becauſe 'nothing is ſo fixt, next Gold, then Silver is in its per'fection; and is the reaſon why Silver-paſſages are 'accompanied with white fluxes and mineral veins; 'next thereunto are ſuch paſſages, in which are gene'rated red mineral Sulphur, and red yellow juyces of 'the noble Gold. Silver metalline Ore is wrought 'many times in a red goldiſhneſs, and cometh forth 'better then the other; a proof whereof may be had, 'if well ordered. White-gold Ore is naturally thus 'tinged of white-copper glaſs, which cauſe ſuch Ores 'and paſſages, by reaſon of the food of their perfect 'Minerals; and with the Glaſs Ore black fumes are 'exhaled, and feed upon Wiſmuth, Lead, and Tin 'Ore, wherein Minerals that ſtrike upon the Lunar 'paſſages are greedily refreſhed: thus groweth the 'firmeſt and compacteſt Silver Ore of its pure, proper, 'and unmixed Stone. They carry and produce alſo, 'not onely mixed chambers, and Mine-cheſts, but alſo 'ſeveral hard and ſturdy mixed Ores in whole Flint'works, and other Copper-flowers, yellow and black 'Ore, and are found different in their nature, form, 'and tincture; ſo that the one is more hard, ſturdy, 'ſlaty, broader, narrower, whiter, blewer in its co-

lours

lours thus qualified, and natural in its end, middle, and beginning. This is the reaſon why theſe Silver fruits and Ores are found differing in their colours and forms; the one being more compact, fairer, and of a better gloſs then the other. Sometimes there is found in ſuch a Vein or Paſſage, firm and compact Gold, Silver, and Copper; ſo it is found ſometimes at *Krenach*. There are found and ſeen alſo in a certain Vein and Paſſage in mixed Lime-ſtones, Lead, Iron, and Copper Ore in one union and juncture. And in one Mine is found Copper Ore, in another is found Silver Ore, and in another Mine is found an Iron ſtone. Some ſilver paſſages are found alſo in their natural Zachſtones, which either are in the hanging or lying ones. Silver paſſages ſhew themſelves alſo with blue gritty flowers, in hollowed fluxes, in ſprinkled marbles, and carry flint-works of ſeveral colours; and theſe paſſages and clifts are full of pleaſant ſilver-colours, of yellow and green, of a colour of Goſlings; the more they are mingled with ſuch colours, the more they have wrought. There are ſome ſilver paſſages and veins which carry three diſtinct colours, after the manner of a Rainbow; where the one colour worketh in nature either more cloſely, or more mildly then the other, in a curious order; and the one may be diſcerned before the other in their paſſing ſtrokes, and ſhootings, together with their chamber colours and floats, as they fell ſeverally, and apart in each Mine-Ore.

Mund. Subter. l.10. Sect.3. c.1,2,3,4. p. 183, 184, 185, 186, 187.

5. *Athanaſius Kircherus* alſo gives us to underſtand of ſeveral ſorts of Silver Ores found in the ſeveral Mines of *Hungaria*; from whence he had reſpon-

ſions to his queſtions ſent to inquire about metallick bodies and minerals, ſome of which held onely Silver, ſome Gold and Silver, ſome Gold, Silver and Copper, and ſome of other ſorts; which may be of ſingular uſe to a diligent ſearcher after mineral knowledge, which would be over-tedious for us to tranſcribe, and therefore we leave them.

6. *Wormius* hath ſome things in this particular worthy to be noted, where he ſheweth what ſilver Ores he had, and in what Coats they were contained; for he ſaith:

Muſ. Worm. l. 1. Sect. 3. c 3. p. 118, 119.

1. A white Marble, in which did inhere ſilver of its own colour, and red.

2. A white Marble, in which was mixed onely ſilver of its own colour.

3. A white Marble, containing *Galena* in it, yielding ſilver.

4. An Aſh-coloured Marble containing ſilver.

5. And alſo another of the ſame kind.

6. A blue one containing ſilver.

7. A kind of flint, which they call *Quartz*, which containeth ſilver of its own colour, and lead.

8. A black Marble, which being poliſhed ſheweth like the Touch-ſtone, to which alſo certain veins of Iron do grow. This is pregnant with ſilver, ſo that when it is poliſhed, ſtreaks and lines of ſilver are frequently ſeen in it.

9. That alſo there is found in the Groves or Pits of *Norway*, a certain Mineral of Silver, aſh-coloured, which is tinged in a certain part of it with a yellow colour, and almoſt an Iron colour, that it is ſuſpected to hold ſomething of Iron.

10. That he had a Mineral of ſilver, fruitful e-

nough, from *Sneberg*, which the *Germans* call **Rotgylden ertz.**

Ut ſupra c.4. p.120.

11. He tells us, That from the Church of **Heerreſtad**, about four *Norway* miles, at the top of a certain Mountain, there are found certain kinds of Earths, in which the ſparks of ſilver do ſhine ſometimes leſs, ſometimes greater, as alſo to be ſeen in the form of moſt tender, or ſmall hairs. To which is adjoyning a vein of pure ſilver of a foot broad; from whence they brought away a piece cut with a hatchet of a pound weight.

From all which I ſhall onely commend theſe two particulars to all diligent and inquiſitive Artiſts.

1. That ſeeing we have in *England* ſo many ſeveral places where ſtore of Lead Ores are gotten, and thoſe Ores alſo of many ſeveral ſorts and kinds, that it might prove worth the coſt and labour, to have ſome ſmall quantities of them (eſpecially thoſe that are moſt likely to contain ſilver) to be teſted and tried *per Cineritium*, to ſee what they hold.

2. That whereas often the Miners find divers other ſorts of Ores and Minerals, which becauſe they yield no Lead, are commonly thrown away and not regarded; that theſe alſo might be tried to ſee what they hold; for it is often uſual that the better is caſt away, and the worſer kept.

Chap. XIV.

Of Silver found pure by Nature, that needs no refining by Fire. And of thoſe ſorts that muſt be purified, their Colours, Mixture, and ſeveral Coats wherein they lie.

WE have in the third Chapter, where we ſpoke of the growth and vegetability of Metals, ſhewed that much ſilver is found pure by Nature, and that needs no refining by the Fire, but is (as they diſtinctly and properly call it) *ſtatim ſuum*, which though we have ſeen now of it our ſelves (though we have ſtrained our abilities, and the intereſt of friends to procure ſome of it) yet we are aſſured from other perſons of ſufficient veracity who have ſeen and handled ſome of it; and that it is often ſo found, we ſhall now prove.

1. *Sebaſtianus Munſter*, a perſon of good credit, eſpecially concerning what he wrote of his own Country of *Germany*, which is alſo almoſt word by word related by *Georgius Agricola*, who wrote about the ſame time, and is alſo recited, and credited by the learned *Wormius*, gives us a moſt remarkable paſſage to this purpoſe. He declareth that (contrary to the opinion of the Ancients) Silver is found pure in divers places of *Germany*, as at *Schneberg*, *Anneberg*, *Gair*, and in the Valley of *Joachim* and *Abertham*, near the Mountains of *Bohemia*. Alſo in the Hill *Voſagus* in *Lotharingia* in the Valley *Liberia*; and two eſpecially, one at *Schneberg* called *George*, the other at *Abertham* called *Laurence* and *Theodorick*; from whence a huge

1. Geograph. Munſt. l.1.c.9. p 7.

‘treaſure of pure ſilver is digged. And that forth of ‘the Mine called *George* at *Schneberg* there was a ‘great Maſs digged, which when *Albert* Prince of ‘*Saxony* deſcending into the Grove, or Pit, with his ‘followers, had uſed for a Table, he is reported to ‘have ſaid, *Frederick* the Emperour is Great, and ‘rich, but yet he hath not ſuch a table as this. ‘*Agricola* relating the ſame ſtory tells us, that none of thoſe ‘that remembred that famous Maſs hath recorded its ‘weight, which doubtleſs (he ſaith) was of many ‘Talents. And *Wormius* reciting the ſame thing, ſaith: ‘It was thought that this Maſs was of many Talents ‘weight. And ſubjoyneth: That the King of ‘*Denmark*, *Chriſtian* the IV. had a Maſs not much leſs, ‘digged forth of the Mines of *Norway*, eſteemed to ‘be five Talents weight. And that in the Grove, or ‘Pit called *Divine Benediction*, there was found a ‘Maſs of pure Silver, in the Year 1629. the ſeventh of ‘*May*, in weight 130 Marks. And further, *Munſter* ‘ſaith; Another grand Maſs weighing ten *Attick* ‘Talents, was digged forth of the Mines in the Valley of ‘*Joachim*, out of the Grove called *Stella*, and *Sulcera* ‘or *Suicera*: which *Agricola* confirms, as but lately ‘digged up in his time. And *Munſter* again ſaith: ‘And that many Maſſes or pieces of pure Silver ‘were digged up at *Abertham*, forth of the Grove ‘*Theodorick*, ſome weighing one, ſome two *Attick* ‘Talents. And *Agricola* ſaith, And that many ‘Maſſes digged forth of the Grove *Theodorick* at ‘*Abertham* of the weight of two Talents, or of one: ‘which muſt needs be a Truth, being eſtabliſhed by ‘the mouth of two or three ſuch credible witneſſes ‘as theſe Authors, and one of them an ocular ‘witneſs too.

De nat. Foſſ. l.8.p.641.

Muſ. Worm. l. 1.Sect.3.c.3 p. 116.

Vid.ut ſupr.

2. To

2.

2. To this very purpoſe theſe Authors tell us further; For *Munſter* ſaith, 'And that many pieces, 'ſome greater, ſome leſſer, were found in the clifts of 'the ſtones, or adhering unto them, or to the Marble. 'And that nature doth figure pure ſilver into the form 'of Trees, Rods, Twigs, or Hairs. And we ſhall here take that eminent and pleaſant relation of *Wormius*; who ſaith: 'That (amongſt others which we ſhall 'nominate hereafter) he had an elegant, and excellent Maſs of ſilver that was *ſtatim ſui*, from the gift 'of the Lord *Stenon Beck*, the Kings Treaſurer, which 'weighed twelve ounces, that did imitate a Vine, with 'branches variouſly ſpred abroad. For divers little 'boughs did ariſe from the broad root, being full of 'fibres, which according to the riſe did ſhew more 'thick truncks, which were writhen variouſly amongſt 'themſelves, and did embrace one another, until they 'did end in boughs and fibres, or ſmall twigs; and 'ſo goeth on in that pleaſant deſcription, which for 'brevity we omit, and concludeth; That it was infected with a leaden colour, which with a ſlight friction would go away, and leave the Metal clean and 'neat.

3. De nat. Foſſ. l.8.p.642.

3. *Agricola* tells us: 'That in the cavities of the 'ſtones are found maſſes of pure ſilver, as alſo little 'pieces ſevered from the Rocks, Stones, or Marbles, or 'cleaving unto them, or elſe moſt ſlender leaves of 'the ſilver do embrace them: or like Gravel, Sand, 'or ſmall Grit, is mixed with the earth. And alſo 'Nature doth form or figure pure ſilver into the ſhape 'ſometimes of trees, ſometimes of little twigs, ſometimes of hairs: after which manner it is often found 'moſt white with flaws, like flakes of Snow, which

do wholly conſiſt of the leaſt threads of ſilver, which 'ſometimes outwardly we ſee tinged with a golden 'or other colour. That alſo is very ſingular which was ſent forth of *Hungary* unto *Kircher*, and thus deſcribed. *I ſend you here a Mineral altogether precious, ſeeing any thing more rare may not be found at this time; where you may ſee the pure ſilver flowring forth into its filaments, or little threads; that which ſhineth yellow is moſt pure gold, that which is of a blackiſh colour is ſilver mixt with gold.* And though he do not tell its weight, nor quantity, yet it ſeems to have been no very ſmall piece, but is a wonderful and rare evidence of the vegetation of this Metal. *Rulandus* doth tell us the very ſame things of the growing of ſilver in divers figures, which we have before quoted. And alſo *Encelius* in the very ſame words adding, that he had ſeen an whole Fiſh, a Serpent, a Scorpion, &c. ſo formed in the bowels of the Earth, of ſuch pure ſilver, which the *Germans* call **Gedygen Silber.**

Mund. Subter. l.10. Sect.3. c.4.p.189.

De re Metal. c.5.p.15.

4. Muſ. Worm. l.1.Sect.3.c.3. p.116.

4. We ſhall now ſhew the ſeveral ſorts of pure ſilver, ſo produced by Nature, that *Wormius* had in his *Muſæum*, and were of leſs weight and bigneſs then ſome of thoſe formerly mentioned.

1. He had a piece of pure native ſilver equalling 3 ounces in weight, which appeared to have been greater by far, becauſe the two ſides which were large, had had ſome parts taken from them, becauſe the footſteps of the Ax or Hatchet, rendring the two ſides plain and equal, did fully ſhew it. When otherwiſe the remaining body of the Maſs, approaching to a form of triangle, was rough, and unequal in its figure.

2. Another piece he had that was branched, ſpreading it ſelf like unto boughs, or twigs, after a certain manner reſembling a Vine, abounding with the wonderful twiſtings of leaves and young twigs, drawing with it little parts of the *lapis ſpecularis*, or that we call *Muſcovy* Glaſs, from which it did grow or ariſe, ſhewing its roots wonderfully wrapped or twiſted together, and that it did almoſt equal two ounces in weight, and had it from the Mines of *Norway*.

3. Rudiments of the ſame he had in another *lapis ſpecularis*, which (he ſaith) without doubt was from the ſame Vein, but not abounding with ſuch plenty as the former Maſs.

4. He had another forked piece, reſembling the figure of an Harts horn, to wit, pure, without any mixture of ſtone, or other thing; branched elegantly, and near the ends adorned with its branches and ſmall twigs.

5. Another he had reſembling an hook crooked, ſharpned at both ends, of a white ſilver colour, ſomething yellowiſh like Oker, it ſticketh together in notches, plainly in its other part it was like a crooked Tooth-picker, ſuch as by Art Workmen are wont to faſhion of ſilver or gold, in the other part like unto a Crows bill.

6. Another piece he had criſped, reſembling the ſhrub Southernwood, thick ſet with little twigs leaning one to another.

7. He had another piece that was rough, and endowed with divers extuberances on the one ſide, as though infected with Oker, on the other ſhewing in it certain moſt elegant Amethyſtine flowers, like gems.

8. Another piece he had like thin leaves growing to a ſtone (to wit) an aſh-coloured marble, which ſticketh to the plate or leaf, and ſometimes as it were pierceth it through.

9. He had a capillary or hairy piece of two ſorts, one criſped and writhen together, the other conſiſting of more thick hairs, moſt ſubtile, plain, and moſt like to Spider Webs.

10. Beſides theſe enumerated kinds of pure ſilver *ſtatim ſui*, he had various elegant particles, which commonly they call **Gaud-ſtein**, in ſome of which Amethyſts, in ſome Cryſtals are ſeen. Some do ſhew a Dragon fighting with a Lion, ſome the twiſted locks of hair, ſome trees, ſome ſhrubs, and infinite ſports of Nature, *&c.* And theſe are ſufficient not onely to ſhew that Silver is found pure by nature, without mixture of any other Heterogeneous ſubſtances, but alſo may further illuſtrate the growth and vegetability of this Metal.

Now we are to handle thoſe ſeveral ſorts of ſilver Ore that is not pure of it ſelf, but ſtands in need of refining, purging, or decocting by the fire to bring it to the perfection of ſilver, of which there are two ſorts: 1. Thoſe that are mixt with other Metals. 2. And thoſe Ores that yield no other Metal but ſilver.

1. Muſ. Worm. l. 1. Sect 3.c.3 p. 118.

1. *Argentum rude*, is that Ore that is digged forth of the earth, and hath mixt with it ſome ſtones, earth, or other Mineral ſtuff, which muſt be ſeparated from it, before it become a pure Metal. Or as *Agricola* defines it in *Bermanno*, which is truly ſilver, but differeth in colour; and ere it attain that colour of ſilver, requireth decoction by the fire; and ſome of

theſe are mixt with other Metals, of which we have ſpoken ſomething before, and ſhall now add a little more.

1. *Wormius* tells us that he had *vena Æris rude argentum continens*, that this was of a golden colour, ſhewing purple, and red ſpots of raw ſilver, having ſomething of the rock mingled with it, in the figure of a rude maſs, of a golden fire-ſtone, or marcaſite; or in a more dilute colour, in an aſh-coloured ſtone, having no purple ſpots mixt with it.

2. A black Copper Ore containing ſilver in it, ponderous, and ſmooth, tending to whiteneſs, by that moſt often betraying that which was lodged in it.

3. An Ore of Iron holding ſilver in it, being blackiſh, and in certain places covered over with an iron-colour; but when broken, ſhining fairly, with almoſt a ſilver colour, and is of an unequal colour, ſhewing various protuberances.

4. *Galena* containing ſilver of a leaden colour, ſhining, and friable, that knocked with iron doth eaſily fly aſunder. Some of them do contain ſilver inviſibly, ſome of them have leaves and thin plates, that are thick enough.

5. Sparks of ſilver is joyned to Talck, and is either mingled with more minute grains, or adheres unto it in the manner of leaves or plates.

2. Now of rude ſilver, though this be of divers colours externally, as of a leaden colour, an aſh colour, black, white, red, purple, liver colour, and yellow: yet notwithſtanding within it hath its genuine colour, which doth ſhine and appear when it is broken with the hard ſtroak of a ſtone or hammer. And in this kind that is accounted the beſt, when forth of an hundred

2. Muſ. VVorm. ut ſupra p. 117.

Lex. Alchym. p. 56.

Agr. de nat. Foſſil. l. 10. p. 655.

hundred pound weight, ninety pounds or more of pure ſilver is drawn, as was often found in the Kings Mount of *Norway*. *Rulandus* reckons, though not this preciſe number, yet he enumerates divers ſorts, of ſome of which we ſhall now ſpeak. To which *Agricola* doth accord; from whence in likelyhood *Wormius* had it.

Muſ. VVorm. ut ſupra.

1. The firſt place is given (ſaith *Wormius*) to the rude Ore of ſilver, which is of its own colour, called by the *Germans* **Gediegen Silber ertz**, of an hundred pound weight, of which more then ninety pounds are made of pure ſilver. Of which (he ſaith) he had one piece excelling the reſt in weight half a pound, having divers inequalities and protuberances, ſhining with a ſilver colour, and of one part having ſomething of purple coloured raw ſilver admixed: which *Chriſtian* the IV. with his own hand drew forth of the Mine or Pit.

2. The next that ſucceeds is crude ſilver Ore, of a leaden colour, which the *Germans* call **Glas ertz**; which appellation (he ſaith) *Agricola* doth not unworthily carp at, when plainly it hath no affinity with Glaſs, but doth emulate Lead, or Plumbago in colour, being a little more obſcure; ſo that by the ſight of the eye, no man ignorant of metallick affairs, can diſcern it, though in nature they much differ. For Plumbago or Galena is compoſed of Lead and Stone; but rude ſilver Ore of a leaden colour, comprehends little earth and much ſilver. Plumbago in the Mortar is reduced with the Peſtle into Powder; but this rude Ore will be dilated, or extended. Plumbago ſmitten with a hammer, or preſſed with the teeth, or cut with a knife doth break, or leap aſunder; but this ſilver

Ore will be dilated, and ſpred abroad. Although ſometimes this Ore is found hard, which is onely tried by the Touch-ſtone, and uſeth to be of a more dilute colour, and is found in divers and ſundry forms.

3. The third is crude ſilver Ore that is black, called **Swartz Silber ertz**, and is a blackiſh ſtone, ſhining with frequent ſparks of pure ſilver, and ſeemeth rather to have obtained a grey then a black colour. He ſaith he hath alſo a black ſilver Ore, to which is mixed in thin leaves pure ſilver, joyned with fire-ſtone, and ſilver of a leaden colour.

4. The next is crude ſilver Ore of an aſh colour, called **Graw ertz**; and ſometimes this aboundeth with much pure ſilver, ſometimes it containeth little. Sometimes it ſhineth forth of an aſh coloured ſtone like moſt ſmall grains: of which he ſaith that he had two little ſtones, which being held to the fire did ſeem to ſweat forth ſilver, and therefore was called of ſome, the Vegetable Moon. And that *Matthesius Sermone* 3. *Sarepta*, did call it **Ruſs-geſproſſen Silber**, that is, ſprouting Silver, becauſe that being thrown into the fire, it doth ſhed forth pure granulated ſilver, like Hemp or Poppy ſeed. The other of the little ſtones that he had of this ſort of Ore did contain red ſilver, inclining to purple. And there was that had a fire-ſtone joyned unto it.

5. He had raw-yellow ſilver Ore, of an earthly and porous ſubſtance, to which ſome Galena was admixed, ſhewing a colour like Oker, more ſoft then other ſorts of Ore contained in ſtones. And ſo ſaith that he omitteth Ores of a red, purple, and other colours, becauſe he was not poſſeſſor of them. And almoſt to this purpoſe the Author of the *Muſæum Veronenſe*. VVorm. ut ſup.

nenſe acknowledgeth that he had ſeen ſome ſuch ſorts, which were needleſs here to relate.

In the next place we ſhall ſhew what ſorts of ſilver Ores, that are raw and crude, the experienced *Rulandus* doth reckon up. For he ſaith that of thoſe Ores of ſilver that ſtand in need of purifying by the fire, there were found ſeveral ſorts in their Mines, ſome of a white, red, leaden, black, purple, aſh colour, and the like; of all which he reckoneth many ſorts, ſome of which we ſhall here tranſcribe, to ſatisfie the curious inquirer, becauſe (he ſaith) that ſix of theſe ſorts were known to the *German* Miners. Lex Alchym. p. 56, 57.

1. Ib. p. 61, 62. I. And firſt, he reckons ſilver Ore of a white colour, and that of theſe ſeveral ſorts.

1. White ſilver Ore that was glebous, or cloddy, found at *Sneberg*, which might be cut with a knife, or beaten with an hammer.

2. White ſilver Ore in a moſt white Marble, found at *Anneberg*, and alſo found there Ore of that colour, like hairs, or wrapped together like a lock of many ſmall hairs; and alſo that which was moſt white, like flakes of moſt ſmall ſilver threds, and other criſped together, in a crumbling earth of a light red colour.

3. That of this ſort of Ore there was ſome found in a yellow clayiſh earth, as alſo in a moſt white flint, and in red ſpar (or that we call *fluores*) that was tranſparent, at *Marieberg* in an hard aſh coloured ſtone; alſo thin plates of white ſilver in a fattiſh ſtone, as alſo thin plates or leaves at *Marieberg* in an hard aſh-coloured ſtone.

2. II. Silver Ore of a leaden colour, that muſt be purified by the fire, he enumerateth theſe ſorts.

1. Of this colour that might eaſily be cloven with a knife, or beaten forth with an hammer.

2. Of this colour in a moſt hard white fire-ſtone, alſo in fire-ſtones that were joyned together, and four-ſquare. Ib. p. 63.

3. Of this colour in white ſpar, that was of ſix angles, likewiſe in purple-coloured ſpar, that was pellucid, and quadrangular.

III. Silver Ore of an aſh colour or grey was found at *Anneberg* in metallick Cadmia, or Copper Ore, as alſo in a maſs, and in white flint. 3.

IV. Silver Ore that is black, in which ſometimes ſhineth ſilver Ore of a leaden colour, ſometimes alſo it containeth little ſparks of red ſilver Ore, and ſometimes ſparks of white Ore; and by how much more it containeth greater plenty of thoſe ſparks, by ſo much it yieldeth more ſilver when it is excocted. But if it be barren, and void of metallick matter (as it is ſometimes) it is to be accounted meerly black earth. 4.

V. Ore of this ſort that is yellow, is found: 5.

1. In yellow earth like hairs.

2. Fire-ſtones like to a purple colour, to which do adhere little grains of a leaden colour.

3. Ore of this ſort found at *Mariebergs* like to a tranſparent horn, which holden to a candle doth diſſolve or melt.

4. Of an iron colour, which ſmitten with an hammer, doth ſhine or ſparkle, and is not known by its ſpecies, but by the fire. Ut ſupra p. 65.

VI. Silver Ore of a blue colour. 6.

1. That which containeth in it ſelf in the middle, as though it were marrow, crude red ſilver Ore.

2. Mixed with white cloddy ſilver Ore, of a leaden colour.

3. Ore found at *Anncberg* of a green colour, digged forth of the Vein called the *Celeſtial Army*; as alſo Ore of a purple colour in the ſame Vein.

7. VII. Now we come to the laſt that we ſhall mention, to wit, crude ſilver Ore that is of a red colour, which the *Germans* call **Roth gulden ertz.** And he ſaith it appeareth to be ſome kind of Carbuncle, but that a Carbuncle doth ſhine more vehemently, but this kind of ſilver Ore more faintly. And that it was found in the Mines, in the Valleys, and alſo in other places, and that in divers manners, but eſpecially three ways.

1. The firſt was bright with a certain blackneſs.

2. Certain ſmall pieces like ſparks do embrace ſome ſort of its rock.

3. Thirdly the ſolid maſſes of it do cleave and adhere to the ſtones, and that ſometimes ſimply, or after a ſimple manner. On the contrary, ſometimes for the other part of it, which hangeth forth in a Point or Pyramis, rounded as a Top, it imbraceth ſome other matter then the Vein containeth: and that in a fourſquare form like a Die, ſometime in a ſexangular form as a Diamond; commonly it conſiſteth of many, and unequal angles as the Iris. Thus doth Nature exerciſe Geometrie in the bowels of the Earth, by a wonderful workmanſhip.

Laſtly, The ſame crude red Ore of ſilver is found interſperſed with *cæruleum*, or native blue, after a beautiful manner: ſo that Nature ſeeming to be weary in perfecting of Metals, doth recreate and delight her ſelf with ſuch colours, which Art with its greateſt endeavours cannot attain unto. And theſe ſorts of Ores were (as moſt of others) utterly unknown

known to *Dioſcorides*, yea to *Pliny* and all the Ancients.

Of this and the preceding ſorts, that diligent Mineraliſt, *Georgius Agricola*, gives us an account to this purpoſe. But (ſaith he) the unwrought, or crude Ore of ſilver that is red; if it be ſoft, it yields not much, or altogether none at all in goodneſs to the crude Ore of Silver that is of a leaden colour. But if it be hard, as in the plentifulneſs of ſilver it is overcome of the other Ore of a leaden colour, ſo it far excels it in moſt excellent beautifulneſs; eſpecially when it is interſperſed lightly with *cæruleum*, or natural blue: or hath the greateſt ſimilitude to the tranſlucid gem the Carbuncle. For it is no doubt but that it hath grown of the matter of a perſpicuous ſtone, mixed with the juice of that from whence ſilver was after to be produced. Therefore it is not onely like to the Carbuncle in colour, but alſo with a tranſparent facility. But notwithſtanding they differ betwixt themſelves, for the Carbuncles for the moſt part do ſhine more fully, and this more weakly. The Carbuncles cannot be filed, but this will be wounded with the file. The Carbuncles either do not at all, or very ſlowly feel the fire; but this put into the fire, doth diſſolve, and is made liquid. This Ore doth vary in figure no otherwiſe then the crude Ore of ſilver of a leaden colour, but more often is angular, and ſometimes ſquare as a Die, ſometimes ſix-angled as Cryſtal, and ſometimes it hath many angles. Alſo its moſt thin plates or leaves do adhere to the Rocks and ſtones. But that ſilver Ore that is pellucid, is like to the Carbuncle; that which is not pellucid, is like Rubrica, or Ruddle, and doth much vary in colour.

De nat. Foſſil. lib. 10. p. 656.

That which is moſt like to mean Ruddle, was digged up at *Sneberg*, forth of that Grove or Pit that hath the name of *Levites*. And (he ſaith) certain old men have affirmed to us with all aſſeveration poſſible, the Mine called *George*, beſides other kinds of crude ſilver Ore, had yielded great ſtore of this ſort. But crude ſilver Ore that is of a red colour, ſometimes contains in it Gold; and ſuch (he ſaith) is digged up in the Mountain called *Carpatum*, at *Boccantium* and *Cremnitium*: and was digged forth of the Grove in the Valley of *Joachim*, that is called *Rich Barbary*. That obſcure ſort which may be dilated with the ſtroke of the hammer, doth more abound with ſilver, then that which is tranſparent, that being ſmitten with the hammer, doth flie aſunder.

Lex. Chym. p.64,65.

Rulandus proceeds, and of the red Ore of ſilver that is pellucid, he gives theſe ſorts:

1. That which was glebous or cloddy, like unto the Carbuncle imitating the Amethyſt.

2. Like unto the Carbuncle, having ſix, ſeven, or eight angles, erected in the form of a Bean, found in a fire-ſtone of an aſh colour, and in native yellow ſulphur.

3. Like the prickles of an earth Hedg-hog, in metallick Cadmia or Copper Ore, which hath the form of a Brain.

4. Little maſſes which appear moſt purely, as though compounded of Rubies.

5. Maſſes compacted as it were of pellucid oriental Granates.

Of the ſorts of red ſilver Ore not pellucid, he reckoneth theſe:

1. Bloud-red, of ſeven angles, called red golden Ore.

2. Glebous or cloddy found in a white metallick Marble.

3. Glebous in a fire-ſtone of a golden colour, like unto native *Minium* or *Cinnober*.

4. Found in ſix-angled ſpar, like to the external coat of a Cheſnut.

5. Found in an aſh coloured ſtone.

6. Found adhering to the Rock.

7. That which was ſomething whitiſh.

8. Found in a white ſoft ſtone.

9. In a fire-ſtone of an aſh colour.

10 Found in *Galena inani*, which the *Germans* call **Blend**; and our Miners in the North, *Blue Blindake*.

11. Another ſort that contained Gold in it.

12. That which was red, inclining to blackneſs.

13. That which was of a Liver colour.

From all this that hath been ſpoken concerning the crude Ores of ſilver, eſpecially thoſe of a red colour, we ſhall commend theſe enſuing particulars to be conſidered of by the Learned and Ingenious.

1. We ſhould heartily deſire that the learned Mineraliſts may be pleaſed to compare what is here quoted from theſe Authors, with what ſeveral ſorts of crude ſilver Ore they have ſeen, or known, or may have in their Repoſitories, that this ſo material a point may be more manifeſt, and that they would not diſdain to communicate it unto others, for the general improvement of this part of Mineral knowledge. 1.

2. We would intreat all noble and generous ſpirits that affect this kind of Learning, and have intereſt and abilities, to trie if the ſeveral ſorts of Ores of this 2.

kind, that are to be had in *Germany*, (where they moſt abound) may in ſome ſmall parcels be procured, thereby to examine how far the credit of theſe Authors may be relyed upon.

3. 3. We intreat all Bermen, Over-ſeers of Mines, or other ingenious perſons imployed about ſuch Works in his Majeſties Dominions, to take ſerious notice of all ſorts of Ores that may be met withal, to ſee if any ſuch ſorts, as theſe before mentioned, may be found, or come by, that exact trials may be made of them.

4. 4. Beſides the two Authors *Agricola* and *Rulandus*, perſons experienced in what they writ, there are ſome others that do teſtifie that Ore is found red, and alſo tranſparent. As *Johannes Rhumelius* (whom I have quoted before, though not to this very purpoſe) doth confeſs in theſe words: That his *Tinctura Solis* was made forth of a Rubie-coloured, red, thorough-ſhining, or tranſparent, bright golden Ore, &c. And that his *Aurum vitæ* was prepared forth of a certain, pure, ſplendent, or ſhining Mineral; which in its firſt coagulation, was found of a red colour. Alſo that learned Author (whoſoever he was) that writ the *Cheiragogia Heliana* doth quote *Paracelſus*, and to this purpoſe he faith; The *Helvetian* Doctor, *in libro Theſauri Theſaurorum*, writing of Minerals, ſaith thus; Nature doth produce a Mineral in the bowels of the Earth, of which there are two ſorts which are to be found in many places and coaſts of *Europe*. But the beſt is in the figure of the greater World, in the riſing of the Star of the Sphere of the Sun: The other in the Sotherine Star, which is in its firſt flower, produced from the Star, of the gum of the Earth; and that which

Antidotar. Chym. p. 248.

P.261.

Theatr. Chym. Vol.4.p.306.

which in its firſt coagulation is found red, in which the flowers and colours of all Minerals do lie hid. Of which words of *Paracelſus*, the aforeſaid Author ſaith thus. Which words literally taken, do ſeem to be underſtood of the Ore of Gold and Mercury; becauſe *Theophraſtus* doth attribute to Argent vive, as to the Mother of Metals (as alſo the great *Phrædro*) all the colours of Minerals, as in the Book of the Generation of things in his Metamorphoſis is to be ſeen. Although they are not awanting, who do accommodate very ſtiffly this Mineral to the red tranſlucid Ore of ſilver (called by the *Germans* **Rotguldig ertz**.) But I (he ſaith) ſhould rather think that it doth agree to another certain kind of Mineral, that is truly fruitful of Gold, but notwithſtanding is not Gold. From whence we may note theſe things.

1. That there were in the time of *Paracelſus*, two ſorts of Minerals to be found in divers places of *Europe*, that in their firſt coagulation were found red, in which lay all the flowers, and colours of Minerals; but he doth not ſpeak that they were tranſparent, nor is it very eaſie to conjecture what kind of Minerals they were, and therefore we ſhall leave the ſearch of them to all curious inquirers.

2. That many thought that theſe were the red Ore of ſilver, by which he plainly grants that there was a red Ore of ſilver, to be found and had, but thinks it not the ſame that *Paracelſus* meant or intended.

3. But conceives the Mineral that *Paracelſus* intended, was an Ore that was fertile of gold, but not gold; which for ſome weighty reaſons we ſhall not here determine, but leave it to be diſcuſſed by others. And the learned *Arthur Dee* (who in his younger years had

Faſcic. Chem. Corollar. c. 2. p. 41.

had with his own eyes often ſeen the truth of the Art by projection made by his Father and Sir *Edward Kelley*) tells us that their matter was taken from a certain mineral maſs, coagulated, lucid, red, and ponderous, being perfect metal in the neareſt power, containing in it ſelf vive-ſpermatick ſulphur, and vive immature Mercury, multiplicable in it ſelf. Of which ſufficient is ſaid to thoſe that underſtand.

5.

5. To illuſtrate this more amply, I find in ſuch Authors as I have met withal, that treat of mineral matters, that there are three ſorts of Ores that are found in the bowels of the earth, that are red, or yellowiſh, and tranſparent.

1. This mentioned by *Agricola* and *Rulandus*, that did contain ſilver in it, and therefore by them ranked in the number of ſilver Ores.

Lex. Chym. p. 458.

2. I find that *Rulandus* tells us, that at *Dreſda* divers ſorts of Sulphur were excocted forth of certain fire-ſtones, whereof ſome were of the colour of crude ſilver Ore, red, and pellucid; ſome other, like native Cinnober, red, and tranſparent. And *Encelius* ſpeaking of native vive ſulphur, of all other ſorts commends that moſt that was tranſlucid, reſplendent, and flouriſhing. And the very ſame is confirmed by *Cæſalpinus*. And the learned *Wormius* tells us, that he had a piece of native ſulphur, weighing ſcarce a drachm, that was exceeding elegant, and was pellucid like Cryſtal, and of a golden colour, plainly like to that which the Author of the *Muſæum Calceolarium* calls Vive ſulphur, digged forth of the gold Mines of *Peru*; which did imitate moſt pure Gold, in a full yellow colour, and ſo tranſparent that it might be aſſimilated to Glaſs.

De re Metal. c.2.p.10.
De Metal.l.1. c.28. p.62.
Muſ. VVorm. l.1.c.11. p.26.
Pharmac. Tom. 2. Not.13. p. 672.

3. *Joſephus Quercetanus* ſpeaking of native Cinnober,

nober, tells us: That Nature did bring forth in certain gold Mines in *Hungary*, a certain kind of mineral Cinnober moſt ponderous, and of a far more red colour then artificial Cinnober. And that it was ſo far tranſparent, and thorough-bright, that it was of no leſs price and eſteem then Gold it ſelf. And this ſort, (though I have uſed mine ultimate endeavours) I never yet could procure nor ſee any, though I am informed by a learned *German* Phyſician, that there is of it in ſome places of his Country, but rarely to be had.

Theſe ſorts (if to be met withal, which I fear cannot be but with difficulty and much diligence) may doubtleſly be indifferent eaſily diſtinguiſhed one from another. 1. For the Ore of native ſulphur, though tranſparent, ſeems not to be ſo highly red as the other. 2. But rather yellowiſh; and again, it containeth neither Quick-ſilver, nor any other Metal, as the other do, the one containing Quick-ſilver, and the other Silver. And alſo the combuſtibleneſs and ſtrong ſmell of this Sulphur doth difference it from both the other; the red tranſparent Ore of Silver, being (I ſuppoſe) neither ſo inflamable, nor of ſo ſtrong a ſmell; and the native Cinnober will hardly burn, and ſcents very little of Brimſtone. 2. The tranſparent Ore of native Cinnober will (as I imagine) with an eaſie fire yield Quick-ſilver, which the other Ore of Silver will not.

6. Vid. Anſelm. Boetium de Boodt. l. 2. Gem. & Lap. c.8,9. p.70,71.

6. The laſt thing we ſhall obſerve is, that whereas *Agricola* and *Rulandus* do tell us that ſome of this tranſparent ſilver ore, that is red, is often found formed very like unto Carbuncles, which (I ſuppoſe) they mean of Rubies or Granates (that which they call a Carbuncle, being nothing but the greateſt and pureſt ſort

of Rubies) and that theſe metalline Carbuncles (as they call them) differ from the other, in that they are of leſs luſtre, more ſoft, and will yield to the file, and diſſolve in the fire; it may be a reaſonable conjecture, here fit to be propoſed to the Learned to enquire after; whether theſe be not of that kind that *Paracelſus* calleth Granates, that did contain ſome Metal; of which he ſaith thus much. 'Beſides theſe there is another peculiar Metal, which is found in Rivers and 'Ponds or Fens, in the form of a grain, like a greater 'or leſs Bean. It of it ſelf is to be melted, or fluxed, 'and may be hammered, but not to the aptitude of inſtruments. This is of no great uſe, neither is its propriety known, what it may contain. And if herein 'Alchymy diſcover nothing, it will not eaſily appear 'what at laſt it may be. It ſuſtaineth many adulterations of Silver and Gold, which do pierce into it, as 'into Copper or Lead. And further giveth us this 'note. Furthermore alſo ſome Granates are perſpicuous in the form of Cryſtal, in which Silver and 'Gold do lie hid. Here he ſeemeth plainly to intimate, that theſe which he nameth Granates, did contain an Anonymous Metal, that was neither ſilver nor gold; neither doth he mention that theſe were perſpicuous or tranſparent, but that there were other ſorts that were perſpicuous, and in form of Cryſtal, in which were contained ſilver and gold: which in probability were ſuch as *Agricola* and *Rulandus* do deſcribe; and that he did not underſtand it of the Granates that are gems, and doubtleſs contain little or no Metal in them. And thus much for curious Enquirers.

Lib. de Miner. Tract. 1. p. 349.

CHAP.

Chap. XV.

How they refine Silver Ore at the Indies, *and of ſome other ſuch things.*

BEcauſe the Natural and Moral Hiſtory of the *Indies* written by that learned and experienced *Spaniard*, is not in the hands of many, I ſhall therefore tranſcribe ſome particulars that may be of very good uſe to an ingenious Mineraliſt, as followeth, where he ſaith thus: ‘The Veins, as I have ſaid, where they find ſilver, runs betwixt two Rocks, which they call the Chaſe, whereof the one is commonly as hard as flint, and the other ſoft and eaſie to break. This Metal is not always equal and of the ſame bounty; for you ſhall find in one and the ſame Vein, one ſort of Metal very rich, which they call *Cacilla,* or *Tacana,* from which they draw much ſilver; and another is poor, from whence they draw little. The moſt rich Metal of this Mountain, is of the colour of Amber, and the next is that which inclines to black. There is other ſomewhat red, and other of the colour of aſhes: finally of divers and ſundry colours, which ſeem to ſuch as know them not, to be ſtones of no value: But the Miners do preſently know their quality and perfection, by certain ſigns and ſmall veins they find in them. They carry all this Metal they draw out of theſe Mines upon *Indian* Sheep, which ſerve them as Aſſes to carry it to the Mills; the richeſt Metal is refined by melting in thoſe ſmall furnaces which they call *Guayra's*, for

H.ſt. of the Ind.c.9.p.232.

‘that is moſt leady, by reaſon whereof it is moſt ſubject to melt; and for the better melting thereof, the *Indians* caſt in a matter they call *Sortche*, which is a Metal full of Lead. The Metal being in theſe furnaces, the filth and earthy droſs, through the force of the fire, remains in the bottom, and the Silver and Lead melt; ſo as the Silver ſwims upon the Lead, until it be purified; then after they refine the Silver many times, after this manner of melting. And a little after he ſaith. ‘At this day the moſt uſual manner of refining in *Potozi*, is by Quick-ſilver; as alſo in the Mines of *Cacatecas*, and others of *New-Spain*. Then after, having related the manner of their getting and purifying of Quick ſilver, he ſheweth how with it they refine ſilver Ore after this manner. We muſt underſtand (he ſaith) there are divers ſorts of Metals, for ſome yield much Silver, and waſte little Quick-ſilver; others conſume much Quick-ſilver, and yield little Silver; and there are others which conſume much Quick-ſilver, and yield much Silver; and others that conſume little Quick-ſilver, and alſo yield little Silver: and as men encounter in theſe matters, ſo they grow rich or poor in their traffique. Although commonly the rich Metal yields much Silver, and conſumes much Quick-ſilver; and likewiſe that which is poor yields little Silver, and conſumes as little Mercury. They firſt beat and grind the Metal very ſmall with Hammers and other inſtruments, which beat this Stone like unto Tan-mills; and being well beaten, they ſearce it in a Copper ſearce, making the powder as ſmall and fine, as if it were Horſe-hair. Theſe ſearces being well fitted, do ſiſt thirty quintals in a day and a night;

Ut ſupra c. 12. p. 243.

‘night; then they put the powder of the Metal into the Veſſels upon Furnaces; where as they anoint it and mortifie it with brine, putting to every fifty quintals of Powder, five quintals of Salt. And this they do, for that the Salt ſeparates the earth, and filth, to the end the Quick-ſilver may the more eaſily draw the ſilver unto it. After they put Quick-ſilver into a piece of Holland, and preſs it out upon the Metal, which goes forth like a dew, always ſtirring and turning the Metal, to the end it may be well incorporate. Before the invention of theſe Furnaces of fire, they did often mingle their Metal with Quick-ſilver in great Troughs, letting it ſetle ſome days, and did then mix it, and ſtir it again, until they thought all the Quick-ſilver was well incorporate with the ſilver, the which continued twenty days and more, and at the leaſt nine days. Since they diſcovered (as the deſire to get is diligent) that to ſhorten the time, fire did much help; to incorporate Silver with Quick-ſilver the ſooner, they invented theſe Furnaces, whereon they ſet Veſſels to put in their Metal, with ſalt and quick-ſilver; and underneath they put fire by little and little, in Furnaces made for the ſame purpoſe; ſo as in five or ſix days the quick-ſilver is incorporate with the ſilver. And when they find that the Mercury hath done his part, and aſſembled all the ſilver, leaving nothing behind, but is well imbrued as a Sponge doth Water, dividing it from the Earth, Lead, and Copper, with the which it is engendred. Then afterwards they ſeparate it likewiſe from the quick-ſilver, the which they do in this ſort; they put the Metal in Caldrons, and Veſſels full of Water, where with certain Wheels they 'turn the Metal round about, as if they ſhould make 'Muſtard, and ſo the earth and droſs goes from the 'Metal, with the Water that runs away: The ſilver 'and quick-ſilver, as moſt ponderous, remaining in 'the bottom, the Metal which remains, is like unto 'Sand: Then they take it out, and waſh it again in 'great Platters of Wood, or Keelers full of Water; 'ſtill drawing the earth from it, until they leave the 'ſilver and quick-ſilver well cleanſed. There ſlips 'away alſo ſome ſmall portion of ſilver and quick-'ſilver, with the earth and droſs, which they call 'waſhings; the which they after waſh again, and 'draw out the remainder. When the ſilver and 'quick-ſilver are cleanſed, and begin to ſhine, and that 'there remains no earth, they put all the Metal into a 'cloth, which they ſtrain out very forcibly, ſo as all 'the quick-ſilver paſſeth out, being not incorporate 'with the ſilver, and the reſt remains as a loaf of ſilver, 'like to a mark of Almonds preſſed to draw oyl. And 'being thus preſſed, the remainder contains but the 'ſixth part in Silver, and five in Mercury. So as if 'there remain a mark of threeſcore pounds, ten are 'of Silver, and fifty of Mercury. Of theſe Marks they 'make Pins (as they call them) like Pine Apples, or 'Sugar loafs, hollow within, the which they com-'monly make of a hundred pound weight. Then to 'ſeparate the ſilver from the quick-ſilver, they put it 'into a violent fire, which they cover with an earthen 'veſſel like to the mold of a Sugar loaf, or unto a Ca-'puchin or Hood, the which they cover with coals, 'and ſet fire unto it, whereby the quick-ſilver exhales 'in ſmoke, the which ſtriking againſt the Capuchin of 'earth, it thickens and diſtils, like unto the ſmoke of a

Ut ſupr. p. 244, 245.

‘ pot covered, and by a pipe like unto a limbeck they receive the quick-ſilver which diſtills, the ſilver remaining without changing the form, but in weight is diminiſhed five parts of that it was, and is ſpungeous; which is worthy the obſervation. Of two of theſe loaves, they make one bar of ſilver, in weight *65* or *66* marks; and in this ſort they carry it to the touch, cuſtom and mark. Silver drawn with Mercury is ſo fine, that it never abates of two thouſand three hundred and fourſcore of alloy; and it is ſo excellent, that the Workmen are inforced to allay it, putting ſome mixture to it, as they do likewiſe in their Mints where as their money is ſtampt.

Ib.c.13.p.247.

In the next Chapter he ſheweth the manner of their making of Aſſays, which he deſcribeth thus:

‘ To give the alloy to every piece, they carry the bars of ſilver unto the Aſſay-maſter, who gives to every one his number; for that they carry many at once, he cuts a ſmall piece of every one, the which he weighs juſtly, and puts them into a Cruſet, which is a ſmall veſſel made of burnt bones beaten: after he placeth every crucible in his order in the Furnace, giving them a violent fire; then the Metal melteth, and that which is Lead goes into ſmoak, and the Copper and Tin diſſolves, the Silver remaining moſt fine, of the colour of fire. It is a ſtrange thing, that being thus refined, although it be liquid and molten, yet it never ſpills, were the mouth of the crucible turned downwards; but it remaineth fixed, without the loſs of a drop. The Aſſay-maſter knoweth by the colour, and other ſigns, when it is refined; then doth he draw the crucibles from the ‘fire, and weighs every piece curiouſly, obſerving ‘what every one wants of his weight; for that which ‘is of high alloy waſtes but little, and that which is ‘baſer diminiſheth much; and according to the waſte ‘he ſees what alloy he bears, according to the which ‘he marks every bar punctually. Their ballance and ‘weights are ſo delicate, and their grains ſo ſmall, as ‘they cannot take them up with the hand, but with a ‘ſmall pair of Pincers: and this trial they make by ‘Candle-light, that no air might move the ballance. ‘For of this little the price of the whole bar depen‘deth.

Now though this way of the refining of ſilver Ore by quick ſilver cannot, in great quantities, be practiſed in *Europe*, by reaſon of the ſcarceneſs, and high price of quick-ſilver: yet in theſe paſſages of *Acoſta*, there are many things worthy of a deep remark, and may by diligent and ingenious perſons be promoted to great advantages, both in regard of ſevering the droſs, and baſer Ores from the more noble; and alſo in relation to the Art of teſting or Aſſaying of Metals, which wants much of that perfection, that careful skill and obſervation may bring it to.

But however the way of ſeparating ſilver from baſer Ores by quick-ſilver in ſmall quantities, we have found very effectual, and cannot but commend it (if performed by a knowing and careful Artiſt) as the moſt certain way of probation of Metals, that we have known, and in ſome reſpects excelling that by Lead, the Teſt, and Fire. Which way of ſeparating the nobler Metals from the baſer, and one from another, was well known unto that learned and experienced Philoſopher and Chymiſt, *Paracelſus*, who very curtly and acutely

Lib. de Separ. rer. natur. 8. p. 103.

acutely (according to his accuſtomed manner) doth mention the ſeveral ways of purifying ſeveral Ores by means of quick-ſilver, giving therein exquiſite Rules, and excellent cautions, to which I commend the curious and inquiſitive Artiſt, the myſtery of which, trial and diligence may find out.

But the way of ſeparating Silver from Lead in great quantities, ſo as to ſave the greateſt part of the Lead, hath been little known or practiſed in *England*, that I could ever underſtand, ſaving by one experienced perſon that had been in *Holland*, and ſeen it done there; and did affirm that they could ſeparate the Silver from the Lead, and in a Tun not loſe above two hundred weight of the Lead: and that if it held above 5 l. a Tun, they would ſeparate it with the charge of fifty ſhillings, and make gain by it; and to that end they bought much of our Engliſh Lead, and did refine it, and ſo make a gain of it. And he made me a pattern of the Furnace and Veſſel, ſuch as they uſed; which (to me) ſeemed a feaſible and rational way.

Laſtly, The whole company of common Chymiſts do tell us great ſtories of *Argentum potabile*, and other medicines drawn forth of this Metal, which they cry up to be excellent remedies for the *Epilepſie*, and other nervous diſtempers: but they muſt pardon me if I give no credit to their hyperbolizing fanſies; for I dare affirm that they are nothing but vain and ignorant brags, and will perform no more then the ſmall filaments or powder of Silver laminated, which (indeed) is nothing at all, except prepared by the univerſal ſolvent, or *Alkaheſt*, as was that blue or azure-coloured tincture or oyl, containing the ſaline and ſulphureous part of the Metal, the mercurial and indeſtructible

Archidox. l. 2. de Separ. Elem. p. 7. Helm. Butl. p 594. part being left behind untouched, which *Paracelſus* mentioneth. And the reaſon of this my ſo poſitive aſſertion, I ſhall give from the experience of that learned Chymiſt *Van Helmont*, which may bear credit againſt a thouſand of the others; who tells us, That the bodies of Gold and Silver are ſo cloſely ſhut, that for the moſt part they elude the whole endeavours of Artiſts (eſpecially thoſe that have not the fore-mentioned key of the *Alkaheſt* to open them) ſo as when they think they are moſt of all opened, they have remitted nothing at all of their former bars or clauſure. And that quick-ſilver, although it ſeem a tremulous and open body, yet notwithſtanding nothing in the whole order of Nature, is more cloſely ſhut up then it; and therefore few of a thouſand Artificers obtain effectual remedies forth of Gold, Silver, or Mercury; but the other four do more eaſily and freely obey the deſires of Operators. Ut ſupr. p. 594. And further he ſaith, That metallick bodies in reſpect of their Mercuries, are all equally ſhut up, with the ſeal of anatical homogeneity; but that their ſulphurs afford us acquaintance and help, if they be rendred familiar. And therefore concludeth thus: De Lithiaſ. c. 3. p. 24. *Quoties namque à mercuriis, ſales & ſulphura diſtinxi, admiratus ſum illorum ignaviam, horumque vero principiorum dignitates.*

So we have finiſhed this tedious diſcourſe of theſe two noble and perfect Metals of Gold and Silver, and ſhall now deſcend to the other, that are called (in compariſon of theſe) imperfect; of which two are compact and hard, of which we ſhall now treat: and firſt of Copper.

CHAP. XVI.

Of the deſcriptions of Copper, of its Ore, Stone, Operation, and ſtriking Paſſages.

Eucel. de re Metal. c. 13. p. 21.

ÆS, or Copper (which was ſo called from the *Iſle of Cyprus*, where it was firſt gotten in great plenty) is a metallick body, participating of a fuſcous or darkiſh redneſs, being ignible, and fuſible, and is as the mean betwixt Gold and Silver; and is generated of *Argent vive*, impure, not fixt, earthy, burning, red, not clear, and of ſuch a ſulphur, it wants fixation, purity, and weight.

De Metal. l. 3. c. 5. p. 179.

And *Cæſalpinus* tells us: That Copper doth in colour imitate Gold; for if its redneſs be a little diluted, it becomes *Aurichalcum*, moſt like to Gold. And that it imitates Silver in its tractable ſubſtance, and ſlowneſs of fuſion; for it requireth ignition before it be melted. But it differs from both, becauſe it doth not bear the trial of fires (as they do) but is univerſally burnt; from whence it is noted to contain much of combuſtible exhalation, for above the reſt of the Metals it yieldeth a ſulphureous ſmell and flame. Beſides, being madefied, it doth moſt eaſily contract a ruſt, which is called *Ærugo*, of a green colour.

Laſt Will and Teſt. c. 5. p. 88, &c.

Now for its manner of lying in the Earth, its Stones, and paſſages, we ſhall give it from *Baſilius Valentinus*, a perſon of great experience in theſe matters; which though it be large and ſomething obſcure, yet we ſhall tranſcribe for the benefit of all diligent and laborious Mineraliſts; and is thus. 'Copper Ore ‘is wrought in its own and proper ſtone, of good pure Salt, and over-hot-burning ſulphur, through an heavenly impreſſion into all its parts, tinged red thoroughout, not quite freed from a ſuperfluous humidity, in an affinity with iron; becauſe their dwellings, or houſes, are ſet one by another, and is the reaſon why the one may eaſily be tranſmuted into the other.

‘This metalline Ore is much wrought in flat float-works, which are green flinty; many times it appeareth in a red or brown form, and is ſeen alſo like lime-ſtone, in black, and yellow flat-works, like unto Coals, in green flinty paſſages, in a twofold manner, either current, or in the manner of a float. Sometimes it is red and brown, mixed with a green colour: ſome are of a lazure colour, ſome of a Copper-glaſs, flinty, and iron ſhot, or of a white food. The Copper Ore in its paſſages, is ſometimes rich of Gold and of Silver; as it is accompanied with curious Zach-ſtones, and incloſed with paſſable ſtones, if ſo be that other Metals and Minerals do not intrench upon them, which corrode and conſume them. And Copper Ore is a flat-work alſo, mixed with foliated Earth, and the mercurial Copper is hardly brought out of it, at, or in an ordinary melting, affords ſtore of iron, and unripe Copper-food, which rub very much the Copper in roaſting, and make it unmalleable.

‘The richeſt Copper Ores are found in *Hungaria*, *Bohemia*, *Sileſia*, *Thuringia*, *Haſſia*, and *Voightlandia*; the like is found about *Trantevan*, where it is every where in the manner of a float mixed with Sand Ore; and where it breaketh vehemently in 'the ſlat-work, they call that *Slat of Clifts* : they are 'poor in ſilver, and ſuch muſt be roaſted, or calcined: 'in ſome places it breaks in a fair blue and brown co- 'lour, or it looks ruddy, of a Copper-glaſs, and like 'unto green Oker: and ſometimes it is white-goldiſh, 'which is called white Copper Ore. It groweth 'white at an effectual mixture, becauſe at its uniting, 'it aſſumeth or taketh in much of Silver, and of Lead. 'It breaks alſo of a yellowiſh, and lazure-like colour, 'green flinted upon floats and moving paſſages, in 'lime and ſpongeous ſtones. It breaks alſo of a blue 'colour, like blue Oker; is Copper, glaſſy, and flinty, in great and huge rocky and marble paſſages, being mixed with a white marble. They are rich in 'ſilver, in green ſlat-ſtones, which are clear and brittle. It lieth dry and green in clifts, open caves, and 'paſſages, like green frogs inſprinkled one in another, 'in a ſtrange manner diſtinct, or parted with ſtrange 'pleaſant colours; which graduated works are loſers 'in half their works; in theſe rocks are ſtrange clifts 'of marble, and of white Veins; yellow flint is inſprinkled, and mixed with Copper paſſages, which 'yield much Silver, have few flowers, are of a ponderous form, break very flinty, of a red glaſs, of a green 'colour mixed with yellow flowers; theſe flints are 'joyned with white gold marble, of a green colour, 'beſide the rocky paſſage. There is found alſo Copper Ore which is rich of Silver, flinty and not white-goldiſh is of a white ſhining glaſs, mighty in dry hollow flat Mines, ſome whereof are mixed with iron or 'ſorts of Wiſmuth, or fire-ſtones. At the one hanging of ſome paſſages, is wrought the *Chryſocolla*, and 'Copper Ore; on the other hanging of the Mine, is

‘ wrought pure flint, all according to the quality and
‘ condition of the Ore. And it is to be obſerved, ſeeing
‘ that Copper Ores are uſually mixed with ſulphur,
‘ eaſily unite with the nether Metal, and joyn
‘ with their ſtones; therefore green flinty copper Ores,
‘ which carry in the drie Lead ſlatty paſſages, a black
‘ molben, are minerallish, and are not rich in ſilver,
‘ nor rich in ſpecies, encompaſſed with immature iron,
‘ and perfect Copper Ore; and ſome are free of it, if
‘ far ſeparated aſunder from dry mineral flats, are
‘ richer in Gold and Silver, according as the ſtones
‘ take in a good natured Ore, they uſually entrench
‘ upon Gold and Lead Rocks, or Antimonial Ore; as
‘ alſo upon Iron and Silver ſtones. There are found
‘ alſo flinty paſſages, that have their mineral juices of
‘ Vitriol and Sulphur, ſome whereof partake of Allom,
‘ and *alumen pluvioſum.* Theſe commonly have
‘ the beſt and moſt Copper paſſages, which are leaſt
‘ mingled with other Metals, as lime and tartareous
‘ ſtones, in which black floats and flats do break, are
‘ incloſed with green, and are of mild quality: at
‘ *Eiſleben* and *Mansfield*, Miners put there ſeveral
‘ proper names to it very exactly, according unto their
‘ nature. Miners in *Miſnia* know leaſt how to diſtinguiſh
‘ theſe; the upper part of clay earth they call
‘ *Putredo*, in which the true earth is alſo; and when
‘ they come to the ſtones, they call it the Day-work,
‘ becauſe they cover all the reſt, and turn quite to
‘ ſtone. The third place they come unto, they call
‘ Night-work, becauſe it is eaſily lifted, and heaved
‘ one after another, and is pure: then they come to
‘ the Cave or Hole-work, which muſt be hollowed,
‘ and ſet; here are the ſtones that muſt be broken:

‘then they come unto the ſlat, and below that ſlat, they come unto the Sand-Oar, though ſometimes it be overgrown at the *Lockwerg*, or Hole-work above the ſlat; then they turn unto the dead earth again. Slat and richeſt Copper Ore at the Silver breathing, lieth alſo on the rocky, horn-ſtony combuſtible Ores, which have their Gold and Silver paſſages of your ſpecial kind, among which there are found ſeveral forms how each of them are diſcerned. In *Hungaria* and *Carinthia* the paſſages yield Copper Ores, which Copper is very malleable, and is at a dearer rate then any is in the whole *Europe*; as their minerals alſo, and eſpecially the Vitriol there, is held to be the beſt, as alſo their Antimony is counted the beſt. The Vitriol hath the beſt and rareſt vertues, which is known to true Naturaliſts, and experience hath found the ſame to be true. I ſpeak ſomething now, which if reaſon and underſtanding were anſwerable, many expences, hard work, and good time could be ſaved; and it comes onely from hence, becauſe Gold breaks ſo near it, and of the ſame Ores is found, where that earth is impregnated with goldiſh ſeed, and make uſe of the ſame food in many ſubtile unitings. Minerals in their generating qualities, are better ſupported among perfect Metals, where they are higher and more effectual, and are beſt uſed for both ſuch perfect Metals, in caſe Nature be rightly imitated, the ancient Philoſophers have had experience of, and made trials of it. There is a remarkable difference found among Minerals which have their deſcent from Gold and Silver Ores, and partly from Copper Ores; they are Minerals and Metals, each have their particular nature, and ‘being, among which ſome Ores look green, and ‘bleach at the day, and grow near other Metals; ‘but their ſtones are moſt like unto Lead-ſtones, ſome ‘whereof are groſſer, ſofter, and harder then others, ‘and ſome are more obſcure, dark, muddy, and ſome ‘more green, and ſo forth.

De Mineral. Tract. 1 p. 349.

To this we ſhall onely add what *Paracelſus* ſaith of this Metal, which is this; ‘Copper is generated of a ‘purple ſulphur, a rediſh ſalt, and a yellow Mercury. ‘Theſe three colours if they be mingled among them-‘ſelves, then Copper is produced. But Copper doth ‘contain in its ſelf its female, that is, its droſs or refuſe; ‘which if it be ſeparated by Art, and the body redu-‘ced, then the male doth appear. But this is the na-‘ture of them both, that the male doth not ſuffer it ‘ſelf again to be deſtroyed, and the female doth not ‘any more ſend forth droſs or ſcorias; and they are ‘different in their fuſion and malleability, as Iron and ‘Steel differ. And alſo if this ſeparation be uſed, ‘either of them being ſevered into its nature, there do ‘ariſe two Metals different one from another in eſ-‘ſence, ſpecies, kind, and propriety. And further ‘ſaith, that though commonly the male and female go ‘together, yet they ought to be ſeparated.

CHAP.

CHAP. XVII.

Of ſome ſigns where Copper Ore may be found, as alſo of its ſeveral ſorts, and the divers preparations it undergoes ere it be pure.

ATHANASIUS *Kircherus* doth give us theſe ſigns to know where Copper Ore may be found. 1. That where plenty of the clifts and ſiſſures of ſtones are, that ſhew of a yellow and blewiſh colour, there is latent Copper Ore. 2. That whenſoever we find ſtones of a blue colour in or among other ſtones of a grey colour, ſhadowed with little Veins of a green colour, then this is a certain token of the beſt and moſt plentiful vein of Copper Ore. 3. That when we ſee the rocks or ſtones in the Mountains to ſhine like Talk, which is nothing elſe but the birth or foliated off-ſpring of a *Marchaſite*, or fire-ſtone, that it obtaineth the next diſcovery of an hidden vein of Copper Ore. 4. Furthermore, when the vitriolate waters flowing from the Mountains, are of a ſomewhat green colour, and of a metallick ſmell, and which cover over the bottoms of the flouds or rivers, with a certain putrid, green, tenuious, and ſlimy matter, as with a skin; it doth ſhew that the Mountains from whence the water comes, are pregnant with Copper Ore.

Mund. Subter. l.10 Sect.4. c. 9. p.216.

Now for the ſorts of Copper Ore, they are twofold, the one when pure Copper is found in the Mine, which is *ſtatim ſuum*, and needs not to be purified by the fire, and the other muſt be refined, and that often ere it be brought into pure clear Copper.

For the firſt ſort which the *Germans* call **Rein ge-** 1.

diegen Kupfer; it is affirmed by ſeveral experienced Authors, that it is found pure ſometimes in the Mines, and needs no purifying with the fire; and ſo *Eucelius* tells us in theſe words: That there is found pure Copper in the Copper and Silver Mines, that is ſuch of it ſelf, without excoction by the fire. And that ſometimes little veins are found implicated with the ſtones; and ſometimes leaves or plates do embrace the ſtone, and that *Albertus* was ignorant of this. And *Agricola* tells us thus much: That pure Copper was not onely found in its proper Veins, but alſo in the ſilver Mines. This (he ſaith) the Ancients knew not, neither *Albertus*, although that he writ that the moſt and beſt Copper was found at *Goſlaria*, and mixed with the whole ſubſtance of the ſtone, as it were a *Marchaſite*, ſo he calleth a fire-ſtone. But *Agricola* ſaith, If it be found mixed with the ſubſtance of the ſtone, it is not pure; that is to ſay, it is not *ſtatim ſuum*, and much leſs moſt pure, but is purified by the help and workmanſhip of the Furnace. But he further ſaith, I do not know that great maſſes of Copper, as there hath been found of Silver, have been digged up; but rather certain little maſſes of a very various figure: to wit, ſometimes in the figure of drops or iſicles, of little rods, or little rundlets, or globes. Alſo its moſt ſmall leaves or plates do cleave to the ſtones. But this native Copper, for the moſt part, containeth ſomewhat of Silver in it. *Wormius* tells us that he had a piece from the Mines of *Oſterdale* in *Norway*, of the figure of little maſſes, laminated plain, conſiſting as it were of moſt ſmall grains joyned together, of a rubicund colour, and truly Copper-like, but exceeding brittle. And although it did ſeem to conſiſt

De re Metal. c.13.p.24.

De natur. Foſſil l.8.p.643.

Muſ. Worm. l. 1. Sect. 3. c. 5. p.121.

of moſt ſmall grains joyned together, by reaſon of which it was very brittle and friable, yet it did cleave together, and was hardly to be ſeparated into ſmaller pieces. He had another piece, to which leaves or plates of Talk were admixed. And he ſaith that very near a kin to this, was that which *Andreas Chiocus* the Author of the *Muſæum Calceolarium* calls the true flower of Copper, and did deſcribe it in theſe words: The true and legitimate flower of Copper is heavy, friable, and of an aſtringent ſapor or taſte, growing reddiſh with a little ſhining colour, flouriſhing forth of its proper Mine of Copper, into moſt ſmall little grains, expreſſing in magnitude the ſeed of wild Poppy. *Rulandus* tells us alſo, ſome ſorts of pure Copper that needed not the fire: 1. Native red Copper free from other Metals, that was found in the Country of *Mansfield* in its proper Veins. 2. Pure, digged forth of the Mines of Silver at *Scheberg*. 3. Red, at *Mansfield*, which contained Silver in it. 4. That which was native and red *Suaceuſe in Alpibus Rheticis*, which did contain gold in it. 5. Of its own colour found at *Giſhubelia*, cleaving like leaves or plates to a hard ſtone of a red colour. 6. Of otherſome cleaving to an hard ſtone, of a whitiſh aſh-colour, other cleaving to a flat ſtone at *Mansfield*, of its own colour; and from *Moravia*, that was *ſtatim ſuum*. The honourable perſon Mr. *Boyl* tells us in one of his *Queries* for Minerals thus: Whether any part of the Metal be found in the Mine perfect and complete? (As I have had preſented me good valuable Copper, and pieces of perfect Lead, that were taken up the one at *Jamaica*, and the other by an acquaintance of mine, that took them out of the ground himſelf in *New England*.)

Muſ. Calceol. Sect.4. p. 444.

Lex. Alchym. p. 10, 11.

Philoſ. Tranſ. N. 19 p. 337. Q. 50.

2. Britan. p. 767. 2. For Copper Ore that muſt be often melted in the fire ere it be brought into the form of good Copper; there are divers ſorts, ſome of which kinds were formerly found at *Keſwick*, and *Newland* in *Cumberland*, as learned *Camden* relateth at large, and the Work was continued a long time, and much good Copper made there; but now the Work is quite left and decayed: yet I am informed that ſome do now melt forth as much very good Copper as ſerveth them to make Half-pennies and Farthings. Some of the Ore I have, which is like a greyiſh kind of *Marchaſite*, glittering with ſome goldiſh ſparks, and very ponderous. Another ſort I have, that ſeems a blewiſh kind of ſtone, with bright ſparks of the colour of gold, and exceeding heavy; and I make no doubt, but that if diligence were uſed, plenty of this ſort of Ore might be found in many places of *England*. And Dr. *Merrett* tells us, that Copper was digged up at *Wenloch* in *Staffordſhire*; and that in the time of *Richard* the Second there was a rich Copper Mine at *Richmond* in the Biſhoprick of *Durham*. But now I do not hear of any gotten thereabouts. Rer. natur. Pinax. p. 208.

Muſ. Worm. l. 1. Sect 3 c. 5. p. 121. *Wormius* tells us thus much, ſaying, Crude Copper Ore obtaineth various differences, in reſpect of its colour, conſiſtence, goodneſs, and coction. For the moſt part it is drawn forth of a *Marchaſite*, or Fire-ſtone, or forth of the *lapis ſciſſilis*, which I take to be ſome ſort of that which we call flat ſtones. Among thirteen peculiar kinds (he ſaith) I find great difference in reſpect of goodneſs and fertility, though they all ariſe forth of a granulated fire-ſtone or *Pyrites*. 1. One kind of this golden *Pyrites* is plainly barren, yielding no Copper at all when it is excocted in the fire. 2. There are two ſorts (he ſaith) whereof an hundred pound weight of Ore doth afford one pound of Copper. 3. Another a pound and a half. 4. Another four pounds and an half. 5. Another four pound and three quarters. 6. Another ſix pound and an half. 7. Another nine pound and an half. 8. Another nine pound and three quarters. 9. Another ten pounds. 10. Another fourteen pound and an half. 11. Another fifteen pound. 12. Laſtly, another ſixteen pounds, which is the higheſt.

1. For ſeveral ſorts of Ores he reckoneth firſt that which is yellowiſh, in which is inſerted whole plates or leaves, in an aſh-coloured ſtone, tending to blackneſs, being very fruitful of Copper, and having particles adjoyned in certain places of a whitiſh-coloured flint. 1.

2. A purple Ore of Copper, or of a violet colour tending to blue, called of the Miners **Braun ertz**, having little crums or grains of a fire-ſtone of a golden colour mingled with it; on the other part purple ſhining Ore mixed with a ſtone of a grey colour; on the other part it hath more of blue, in the midſt of the body ſparks of Copper growing whitiſh, mixed with golden ones. 2.

3. *Engliſh* Copper Ore, conſiſting of a black ſtone, and hard, in which doth intermingled ſhine here and there a golden colour. In ſome places it ſhineth with the various mixture of black, blue, and golden colours. 3.

4. A golden Pyrites friable, or crumbling, ſhaped like dice, having certain ſpots of a purple and hyacinth colour admixed with it. And from *Oſterdale* in *Norway* he had brought without ſquare, and ſhining with divers colours. 4.

5. 5. A more baſe Ore of Copper growing blackiſh, in which is inſperſed here and there golden Veins, going unequally through the body of the ſtone. Then alſo an aſh-coloured ſtone, having golden-coloured grains interſperſed in it in courſe, fruitful in Copper, infected on one of the outſides with certain Oker.

6. 6. An ironiſh Ore of Copper, in which a Vein of a ſquare golden fire-ſtone doth ſhine, and here and there portions of rubiginous iron. I have by me very many ſorts of theſe ſquared or diced golden Marchaſites, and ſome of other figures; but whether they hold Copper or not, I have not tried.

The Author of the *Muſæum Calceolarianum* mentioneth theſe four ſorts of copper Ore:

1. 1. One that is red, containing ſome ſilver in it, from the *Carpathian* Mountain, which is moſt fruitful of Metals.

2. 2. Alſo the Ore of copper at *Kepnice* in *Miſnia*, which is not red, but hath a leaden colour, repleniſhed with certain little yellow Veins; for every hundred pound weight of which, by the help of the Furnace, is extracted two and twenty pound weight of Copper.

3. 3. The Ore of Copper from *Inaceburg*, like to a cloven or flat ſtone, of almoſt an aſh-colour, in which little Veins imitating a golden colour, are ſeen growing, an hundred pound weight of which yields twenty pounds of copper.

4. 4. The Ore of copper from *Anneberg* ſhining with a reddiſh colour, forth of an hundred pounds weight of which, the Vein being poor, yieldeth onely ſixteen pounds of Copper. We have enumerated theſe ſeveral ſorts of copper Ores, that the laborious Mi-

ners may be better enabled to judge of the ſeveral ſorts of Ores. Now for the ſeveral preparations that the Ore of copper undergoeth before it be made good valuable copper, *Wormius* tells us thus, ſaying, I have ſix differences in reſpect of the excoction of copper. Muſ. Worm. ut ſupr.

1. Of which the firſt is the crude Pyrites or fire-ſtone it ſelf, of a golden colour, as it is digged forth of the Mine, and rich with copper.

2. The ſecond is of the Ore, burned by the ſpace of fourteen days, or three weeks. For then the maſs is rendred copper-like, of a blackiſh colour, forth of which *viride æs* doth flower.

3. Thirdly the Ore ſo excocted and fluxed, that it is reduced into thick plates, which the *Germans* call **Kuffer ſtein.**

4. Fourthly, Theſe plates being put into other Furnaces, are burned ſix or eight times, and are carried forth of one Furnace into another, until they acquire a rubicund colour; this they call **Kobber werk.**

5. Fifthly again, it is excocted into a ſpongious and light matter, black and porous, which they call Raw copper.

6. Sixthly, It is melted again, and then becomes pure copper, fit for uſes. So many mutations it is meet that the Ore of copper undergo, before it become pure Copper.

Chap. XVIII.

Of native and factitious Orichalcum, of Corinthian Copper or Braſs, and of ſome other Compoſitions that Copper undergoes with other Metals or Minerals, and of the Medicines prepared forth of it.

Rer. Deperdit. Guid. Panciril. Hen. Salmuth. Comment. Tit. 8.p.26,27.

That native *Orichalcum* (and not *Aurichalcum*, as though it were compounded of Gold and Copper, which learned *Salmuth* quoting *Scaliger*, doth deny, and that with reaſon) was digged in ancient times forth of the earth, ſo produced (as *Salmuth* and *Kircher* do probably conjecture, by ſome natural commixture of *Terra Cadmea*, or the *Lapis Calaminaris* with it) not as mixed of Gold and Copper, but a certain kind of native Copper, which had the colour and ſplendour of Gold, or which was like unto Gold. There is little or no mention made of it by the Ancients, except *Pliny* in theſe words ſpeaking of Copper, that (he ſaith) was firſt found in *Cyprus*. *Reperto in aliis terris præſtantiore, maxime Orichalco, quod præcipuam bonitatem, admirationemque diu obtinuit; nec reperitur longo jam tempore, effœta tellure.* That there was better Copper then that of *Cyprus* found in other Lands, eſpecially *Orichalcum*, which for a long time obtained the chief eſteem in goodneſs and admiration; neither was it to be found for a long time before the age of *Pliny*. But *Salmuth* ſaith there did remain of it certain ſorts or maſſes, and many fragments.

Hiſt. nat. & Plin. l.34. c.2. p.471.

ments. And that it was of ſo great eſteem with the Ancients, that when it was no where to be had, notwithſtanding as if it were to be had, it was eſteemed more excellent then gold; and gives thereof ſome notable proofs, that the Inquiſitive may find in the place before cited. And *Pancirollus* ſaith, *Orichalcum* was a Metal of Copper, which was like to Gold. Of which kind (he ſaith) I ſuppoſe the *Toreumata* were: The *Toreumata* were Works emboſſed in Metal, which the Ancients (he ſaith) did ſuppoſe to be of *Corinthian* Braſs; but falſly: for the *Corinthian* Copper or Braſs, was a mixture of Copper and Gold. But that theſe emboſſed Works of Metal being deſtroyed or diſſolved, had nothing in them of Gold or Silver: and therefore (he ſaith) he doth believe them to be of native *Orichalcum*. And though *Pliny* thought it loſt, yet (he ſaith) it is manifeſt that the Lawyer *Martian*, who lived in the time of *Alexander* the Emperour, in the Year 225. did make mention of it as though it had been extant alſo in his Age. And that *Lattone* or *Orichalcum* (he ſaith) that they uſed in his time, was not the native *Orichalcum* of the Ancients, but Copper mixed with certain powders that give it that ſplendor. And *Scaliger* (who would ſeem to know all things) and alſo *Kircher* tell us, that betwixt *Mexico* and *Darien* natural *Orichalcum* was digged up that could be melted with no violence of fire, which did ſufficiently demonſtrate the truth of the thing.

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Exerc. 88.
Mund. Subte.
l. 10 Sect. 4. c. 9. p. 218.

Now for factitious *Orichalcum*, the ſeveral ways by Art to prepare it, the Reader may find in the forecited place of *Kircher*, and we ſhall onely mention one way ſet down by *Wormius* forth of *Agricola*. They

Muſ. Worm. ut ſupr.

Vid. Albert. Mag. de Reb. Metal. l. 4. p. 352.

They put (he ſaith) the fragments of the beſt Copper, and of *Cadmia nativa* (I ſuppoſe he meaneth the *Lapis Calaminaris*) by courſe (or as the Chymiſts ſay, *ſtratum ſuper ſtratum*) into long pots, which being ſo filled, are ſet in hollowed Furnaces, and the fire is kindled, as it were in certain burrows, channels, or paſſages, and when they are molten together, the Copper being tincted with the colour of gold, is changed into *Orichalcum*, which is that we call Braſs, or by ſome *Flanders* Metal. Which is hard, tractable with the hammer, and to be drawn forth into thin plates or leaves, which being tinged with gall, becomes like gold, and is called of *Pliny*, *Aurum Coronarium*, becauſe the Players did uſe it for Garlands and Crowns about their heads; which is that which we commonly call Horſe Gold, uſed for Embelliſhments in Pageants, Plays, Shews, and ſuch like paſtimes. And of this ſort ſome is more malleable then other, and will ſuffer it ſelf to be drawn forth further; and ſome is of a deeper, and ſome of a lighter colour. Again, There is by Art made divers ſorts of this *Orichalcum* or Braſs, ſome that (as I believe) will abide the hammer in ſome meaſure, of which is made fire-tongs, fire-ſhovels, ſnuffers, Mathematical inſtruments, and of many other ſorts and kinds, that I cannot well reckon up. Some that will hardly abide the hammer, but either cleave, or break aſunder, which is called *Æs Caldarium*, and we call it Pot Metal; of which is made Pots, Pans, Chafing-diſhes, Candleſticks, and abundance of ſuch like utenſils, ſome of a fair golden colour, ſome more whitiſh, and ſome more inclining to redneſs, according to the proportion of the commixture. Again, Copper is mixed often with Iron, Lead, and ſome other materials, of which is made bullets for great Cannon, Bells, and many other ſuch like things. Sometimes they mix a certain proportion of Copper and Tin, of which little Bells for Houſe-Clocks, and little Alarum-bells, and ſome things elſe are made; and thoſe Bells will ſound ſharp and ſhrilly. And of this Compoſition may be made fine Seeing-glaſſes and Burning-glaſſes, if they be well poliſhed and ſmoothed, and made of a right figure and bigneſs, of which I have ſeen divers ſorts. And with a mixture of Tin and Braſs are made Veſſels that appear very like unto Silver: all which Compoſitions and many more of this Metal of Copper, with other Metals and Minerals, we ſhall leave as ſooner to be learned by practice, and ſight, from Artificers and Mechanicks, then from Books and reading. As for the making of Copper white it is practiſed ſundry ways, ſome do it with Talk, ſome with the *Magnetis*, or Cat-ſilver; and that which we have ſeen done, was with *Arſnick* and *Nitre*; the way of doing which may be found in many Authors, as alſo in Manuſcripts, and written Proceſſes; but I do not account the knack ſo much worth, as to be at labour to tranſcribe it. For both Copper when it is whitened, or made *Orichalcum*, or of a golden colour, will with often fluxing, and keeping long in the fire, burn out the Minerals commixt with it, and return to red Copper again as it was.

Now whatſoever common Chymiſtry may boaſt of the medicaments prepared from Copper, as its Sulphur, Tincture, Salt, Crocus, or the like, we have not ſeen, or experienced any that do deſerve any great commendation, and therefore ſhall forbear to ſay any more of them. Onely we ſhall add this; That even Vitriol, ſuch of the blue tranſparent ſort that is brought forth of *Germany*, and commonly called *Roman Vitriol*, and by Quacks, and others, called *Lapis Cœleſtis*, which is of great affinity with Copper; nay, indeed the very off-ſpring of *Venus*; and that which many account the beſt, that holds the moſt Copper, is a moſt noble Mineral, and even of it ſelf affords much help to an expert Chirurgion; for it is one of the mildeſt Corroſives that an Artiſt can uſe for making of Fontanels or Iſſues, and is far better then any actual Cautery, and ſerves better then any thing elſe for ſtopping fluxes of Bloud, eſpecially in Amputation, or diſmembring, where the great Arteries and Veins are laid open. And the Powder of it is very prevalent in cleanſing old ulcers and ſores, and by its aſtringency leaves a good ground for breeding new fleſh, and healing. The waters of it alſo are exceeding profitable for many diſtempers in the Eyes, ſore and inflamed mouths, and for all Eryſipela's and the like. And the Phlegm, and oyl of it, as alſo the Colchotar freed from its Salt, will do a Chirurgion much credit in deſperate ulcers and old ſores, though but prepared by the way of common Chymiſtry, if he know how to apply them with judgment and diſcretion. I ſpeak this to encourage young practitioners, having my ſelf had experience of this Mineral for near forty years, in all things that Chirurgery can require properly to uſe it in. Yet notwithſtanding as to Medicines that may be taken inwardly, prepared the common way, I have not ſeen any ſuch effects by them as may any way anſwer the high Encomiums that many Authors that write of common Chymiſtry, do attribute unto them; for except that the oyl or ſpirit of Vitriol (as ſome call it) mixed with liquors or Juleps, doth in ſome meaſure allay, and abate the heat and thirſt in Fevers, and hot diſtempers, and ſometimes to be helpful in Epileptical diſeaſes, I have known or ſeen little effect by it. The *Vitriolum vomitivum* (I confeſs) being duely prepared, and purified, is a laudable Vomit againſt Phlegm, and ſuch like crude humours annoying and over-burthening the ſtomach; and is a remedy of much efficacy and value againſt the Worms, and all Verminous generations.

But there are far higher and more noble Medicines to be had from *Venus*, or Copper (if we may truſt the writing of *Helmont*, whoſe veracity and experience few learned men will queſtion or doubt of) then any of thoſe that are prepared by common Chymiſtry; by the help of that immortal and immutable liquor the *Alkaheſt*, by which (he declareth) that the body of Copper is totally deſtroyed, and the external Sulphur and Salt (in which the medical Virtue lies) is ſeparated, and the internal Sulphur that is inſeparable from the Mercury, either by Art or Nature remaineth, by which it may be brought into a white metal. But of this as far as by the *Alkaheſt* the medical ſulphur is ſeparated from it, by which that univerſal medicine called by *Paracelſus* and *Helmont Mercurius Diaphoreticus*, and *Aurum Horizontale*, by mixing with Præcipitate prepared after *Vigo*'s order, is made; we ſhall give here, as far as concerneth the Copper in *Helmonts* own words, and the reſt we ſhall mention when we come to ſpeak of Mercury; and thus he ſaith. ‘For the Sulphur of *Venus*, after its ſeparation from its body, and ariſing again, is made as it were a glo-

De Lithiaſ. l. c.8.p.64.

rious ſulphur, and therefore it tingeth the ſulphur of Mercury (which in the powder of *Johannes de Vigo*, by corroſive Mineral ſpirits is extroverted) immediately, and do mutually imbrace themſelves in an inſeparable bed: and therefore the force of both ſulphurs do then ſtand outwardly. And a little further he ſaith. ‘Therefore the fire of *Venus*, is not the ſpirit of Vitriol, however exquiſitely rectified: But this fire is the volatile ſulphur of the Copper, in form of a green oyl, more ſweet then honey, and fully ſeparated from the mercurial body of its Copper. But the remaining part of the Copper doth abide white, nor ever waxing green with ruſt, as neither any more of the number of the ſeven Metals; becauſe it is become a new and anonymous Metal. But the fire of *Venus* cannot be had, except by the full or plenary deſtruction of the Copper, and the volatization of the mercurial body of the *Venus* it ſelf. Which, however it be made volatile in the form of oyl, notwithſtanding with an eaſie labour, it is after again reduced into a white unknown Metal, and extenſible under the hammer. But the fire or ſulphur of *Venus* is not any more reduced into a Metal by it ſelf, becauſe as no ſulphur is a Metal, ſo every metallick Mercury is a true Metal. For the Adeptiſts teach, that the ſulphureous part of a Metal cannot be ſeparated from its mercurial and metallick body, except by its total deſtruction; which therefore (although abuſively) they call elemental; becauſe, to wit, in Metals there are two ſulphurs; one therefore they deſervedly call external; the other internal. But in the propoſed terms of Copper (he perſuadeth) to contemplate that which is internal, which doth fix the body in ‘the white anonymous and mercurial Metal, and maketh it ductible under the hammer: when otherwiſe the Mercury without the Sulphur could never be coagulated into a Metal. But that external ſulphur of *Venus*, is that green ſweet oyl which cannot be brought back again into a Metal. Therefore the *Symmiſtæ* or Secretaries of this Philoſophy, do univocally teſtifie, that the external ſulphur cannot be ſeparated from its body, no not by fire, in imperfect Metals, but alſo the mercurial part doth periſh together with it. Therefore ſeeing that external ſulphur (ſuch as is drawn forth of Copper) is not neceſſary to the perfection of the Metal: but that ſulphur is added of God to the Copper. Therefore it is neceſſary that that ſulphur of *Venus* ſhould have its ends, conducing to the neceſſities of ungrateful man, to wit, for humane infirmities, above all the dignity of metallick perfection.

From which we ſhall commend ſome conſiderations to the ſons of Art to revolve over, and ſeriouſly to weigh them in the ballance of a right underſtanding, and not ſlightly to paſs them over.

1. To take careful notice of the effects of this incomparable liquor the *Alkaheſt*, both in working upon Vegetables and Minerals; for without it no true natural or radical diſſolution can be made of either of them. Which if they duely weigh with the true light of a rational underſtanding, it will lead them as a thread through all the Labyrinths of darkneſs, to the bottom of the clue, that is the knowledge of the true ſubject forth of which it is prepared: Which ſubject is but one in the whole Univerſe, and is commonly known, and may (as *Baſilius* ſaith) with great

praiſe be had, and is not any particular of the animal, vegetable, or mineral Kingdom, but in it ſelf (though to outward appearance a baſe and deſpicable matter) is of the nature of them all, but not any common or known ſalt, as many deem, nor no kind of earth (except metaphorically ſo called) nor any univerſal or catholick ſalt or water (as many that do think themſelves wiſe do imagine) drawn forth of the air, or the beams of the Sun, but is in a far nearer ſubject: and therefore I ſhall onely mind them of what *Raymundus Lullius* tells us, ſaying; *Nihil ergo convenit rei, niſi quod propinquum eſt ei ex ſua natura.* And *Helmont* tells us in ſome place of his writings, that things to be diſſolved, are to be diſſolved *per conſentanea ſuis principiis radicalibus.*

Codicil. p.13.

2.

2. We are to note that this fire, or ſulphur of *Venus* when volatized and ſeparated from its white mercurial anonymous body, is in the form of a green oyl, never again to be reduced into a metallick body, and that in this the whole medical virtue lies. And this is doubtleſs the ſame green oyl that *Paracelſus* in his Book, *De Separatione Elementorum*, ſaith is altogether green, and drawn from the body of *Venus* left white, that may be again reduced into a white Metal, that it cannot be known under what ſpecies it falleth. And this queſtionleſs is that green oyl, or *Arcanum vitrioli* that *Paracelſus* ſo highly commends in curing the Epilepſie, whoſe preparation he in many places mentioneth; but according to his wonted manner, tacitely concealeth the *Alkaheſt*, without which it cannot be truly had or prepared. And forth of this green oyl was prepared that rare ſoporiferous Medicine which he calls *Sulphur Anodynum Veneris*, of excel-

C. de Metal. p.7, 8.

De Morb. Ament. l. c. 1. p.575, 576.

lent vertue, ſo that it would ſopifie, pacifie, or cure a whole troop of diſeaſes: Of which, and other metallick Sulphurs, he gives us theſe enſuing commendations. And that (he ſaith) I powerfully regard or look into the ſulphureous remedies of Minerals, to wit, into the ſulphur of *Venus*, *Stibium* or *Antimony*, and eſpecially into the ſulphur of the *Glaura Augurelli*, which Nymph hitherto doth want another proper name. For theſe kind of Sulphurs, becauſe they are farther diſtant from humane Nature then the whole company of Vegetables, and in the mean time do obtain notable gifts from God the giver of them; ſo alſo they moſt fully and pertinaciouſly reſiſt, that from the digeſtive faculty they bend not into the Commonwealth of Aliments, and therefore they do preſerve their native powers free and unbroken, to wit, the *Craſis* or temperament of the Minerals doth remain whole or compleat, and more fit to diſperſe their ray into *Duumviratum*, the ſeat of the Soul. For hitherto the ſulphur of Minerals under *Vulcan*, or the Fire, do obtain their higheſt complement of the intention of Phyſicians. Therefore I exhort young *Tyroniſts* or Freſh-men to deſpoil ſulphurs of their ſtrange and virulent force, under the cuſtody of which verily the vital fire is hidden, leading the *Archeus* moſt pleaſantly into deſired ends. For there are certain ſulphurs, to which being corrected and perfected, the whole company of diſeaſes do hearken: whoſe plurality as it were is contracted into the unity of the *Archeus*, as into the fiſt of a man fighting. From whence we may note:

In verb. herb. & lap.l. p. 577.

1. That the farther a Medicine is from being changed, or brought into aliment, the more it is to be ac-

counted Medical, and may more vigorouſly ſpread its rays to the very center of the diſeaſes.

2. The chief point in curing diſeaſes, conſiſts not ſo much in the purging of humours, as in the pacifying of the *Archeus*.

3. That the chiefeſt medicaments for curing the generality (if not all diſeaſes) conſiſts in mineral ſulphurs, eſpecially when they are deſpoiled of their ſtrange and virulent force, which every Artiſt ought to labour to attain unto.

4. That one of theſe chief ſulphurs is this of *Venus*, before ſpoken of; another is the ſulphur of Antimony, which doubtleſs muſt be prepared by the Alkaheſt; for thoſe two ſorts that are prepared by common Chymiſts, whereof the one is fixed by a *Lixivium* or *Alcali*; and the other volatile, of another way of preparation, though they will do ſome pretty things, eſpecially that which is volatile; yet come they far ſhort of the vertues of that of *Hélmont* and *Paracelſus* preparations: for this ſulphur I take to be his *Tinctura Lili Antimonialis*, and account it one of the *Arcana's* of *Paracelſus*: for he ſaith, In the third place is the tincture of *Lili* alſo Antimonial, almoſt of the ſame efficacy with the former (which is his *Mercurius Vita*, which is the off-ſpring of the whole *Stibium*) although of leſs force. The laſt Mineral ſulphur that he moſt reſpecteth, is that of the *Glaura* of *Augurellus*, which hath no other proper name; and what Mineral it is, many make a great doubt; and truly all I dare reveal of it is, that it is a very common and known Mineral, and of a metallick root and principle, if not the very root of all Metals and Minerals: but I would not have the Reader ſuppoſe that I mean it to be (as many that

Arcan. Parac. p. 790.

think themſelves very knowing, do imagine) native Mountain *Cinnober*; for I muſt aſſure them it is not, for that is not the root of Metals, as the *Glaura* is. But it cannot be better known then by that appoſite deſcription that learned *Augurellus* hath given it. To which I commend the curious Student, and Searcher, and to compare it with what *Paracelſus* hath ſaid, and alſo *Helmont*, of the *Metallus primus ſive maſculus*, and the *Electrum minerale immaturum*; and to conſider whether they be all one Mineral or not; for I cannot, for many reaſons, diſcover it any further; and I am ſure here is ſufficient for thoſe whom God will direct to know the ſecrets of Nature in the mineral Kingdom.

3. We ſhall here with *Helmont* wiſh all ingenious Students, and Searchers after Natures Secrets, ſeriouſly to conſider of, and ponder this white anonymous Metal of Copper, after the external ſulphur is ſeparated from it, that it remaineth a true and real Metal ſtill; and that the external ſulphur of Metals is not anatically homogeneous, nor eſſentially neceſſary to the conſtitution of that which may be truly called, and is a Metal. And if they heedfully weigh this, and compare it with what *Helmont* elſewhere ſaith of common Quick-ſilver; that all of it hath in it leſs or more of an external Sulphur, that may be ſeparated from it: as alſo with what *Paracelſus* ſaith in the fore-cited Book of *The Separation of Elements*, that though the ſulphurs of the ſeven Metals being ſeparated from their mercurial parts, and are of divers colours, which he there deſcribeth; yet that the mercurial part of all, or any one of them, doth after that ſeparation remain white, and may be reduced into a metallick body, which cannot be known of what ſpecies any of

them are of. If this be well conſidered, it will manifeſt that the Adeptiſts were not men led by Opination and fanſie, (as many that would ſeem Maſters of no little Learning, do vainly dream and object) but men that fundamentally and experimentally underſtood the nature of Metals, and the ſubject they writ of, otherwiſe then thouſands that are, and have been rigid cenſurers of them and their Works; but blind men are not fit to judge of colours. And further, if all Metals when diveſted of their external and combuſtible ſulphurs, be and remain Metals ſtill, although of a white colour; as appeareth plainly from the unqueſtionable experience and authority of theſe two perſons; then let the Artiſt and Learned conſider what is the difference among them one from another. Is it ſpecifical,or only gradual? Let them ſpeak that are fit to judge, and by this thoſe that can underſtand and take it, may perceive what that tranſmutation is that the Philoſophers ſpeak and write of, and will open to the Learner the true way he is to walk in; and the real end that Alchymy aims at. And above all it will open the reaſons of that moſt aſſured and true maxim of theirs, which is, that *omnia metalla in ſuo interiori ſunt Sol & Luna.* Compare this with what we have ſaid before of the Hematine Metals of Gold and Silver. So we will conclude this tedious diſcourſe of this Metal, willing the Reader to look upon what *Sebaſtian Munſter* hath ſaid in his Geography, concerning Copper and its kinds; and ſo we ſhall deſcend to the next of the harder ſort of Metals, which is Iron.

Geograph. c. de Ære p. 8.

CHAP.

CHAP. XIX.

Of the deſcriptions of Iron, its Ore, or Mine, Operation, Stocks, Flotes, and Paſſages.

THe other imperfect Metal, famous in its hardneſs, called of the *Greeks* Σίδηρος, of the *Germans* **Eiſen**, is a metallick body conſiſting of little Mercury, and much fixt Sulphur, abiding ignition long, and very ſlowly fuſible, eaſily contracting ruſtineſs, of a ſomething whitiſh livid colour. *Rulandus* gives it thus; ‘Iron is a metallick body, much livid, little red, hard and participating of a whiteneſs not pure. For if a fixt earthy ſulphur be commixed with *Argent-vive* fixed, and earthy, and both theſe be not pure, but of a livid whiteneſs, if the ſulphur bear ſway, it becomes Iron. In brief, if the *Argent-vive* ſhall be porous, earthy, and impure, and the ſulphur alſo impure, fœtid, and earthy, and of a fixt ſubſtance, Iron is generated. *Paracelſus* ſaith of it thus: But on the contrary, Iron is generated of a ſulpher, Salt, and Mercury; of all the leaſt fluxible, contrary to the nature of Tin and Lead; and is coagulated into an hard Metal, and is coupled in it ſelf. For in one two Metals are conjugated, to wit, Iron and Steel: Iron is the female, and Steel the male. And this conjugation is like to that wherein Gold and Silver, to wit, the male and female, do alſo grow up together. So they may be ſeparated one from another, the female into her ſex, and the male into his alſo. And the male may be imployed to its uſes, and the

Muſ. Worm. l. 1. Sect. 3. c. 6. p. 123.

Lex Alchym. p. 206.

De Mineral. l. 1. p. 348.

Laſt Will and Teſt. c.6.p.92, 93, &c.

'female alſo to hers. *Baſilius Valentinus* gives us its deſcription, and the manner of its Ore lying after this order. Iron-ſtone and Iron Ore is wrought in its Mine-ſtone, according to the heavenly influence of *Mars.* For he is *Trinus Magnus*, the great Lord of War, and an inſtrument whereby others are forced and compelled: of an hard earthly impure ſulphur, of putrefied Salt, and groſs Mercury; which three principal pieces in their juncture mix much of earthlineſs, therefore it is a difficult labour to mollifie Iron with, or in the fire, carrying much of impurity, by reaſon of its ſulphur; and above other Metals, it hath a deep, red, quick Spirit, which if it be taken from *Mars*, then is the Iron gone alſo, leaveth again a putrid earthlineſs. Iron is not eaſily mixed or joyned with other Metals, or united in the caſting. Iron hath a threefold partition, and ſeveral parts in its earthly Ore, namely a magnet, a quick metalline Ore, which hath its quality from quick Mercury, and muſt hold communion and affinity with Iron, muſt be quickned and renewed with Iron filings, in which he lieth like an Hedge-hog, and is indued of *Sol* in Nature with glorious gifts and Adamantine vertues; at one place and ſide it attracteth, and at the other ſide it refuſeth; which vertues may be augmented and increaſed in it. A true type of juſt judgment, it ſheweth after the Sun the true hour in the body of the Compaſs, by Water and by Land.

'Secondly Steel, the hardeſt and pureſt, moſt malleable Iron, of its proper light draining place, wherein it lieth cloſe tied and knit together in all its parts moſt compactedly, which in all Iron-works is uſually put to the edge and point.

‘Thirdly, there comes the common Iron Ore, ordered together by its earthly ſulphur; which three miniſtred good thoughts to the firſt expert Naturaliſt, that Maſter of Mine-Works, *Tubal-Cain*, who made his three principles in all things, and made his dimenſions in the Mines in three parts, in which ſuch metalline Ore was: he found at firſt the Iron-ſtone wrought in ſeveral ways, namely upon ſtanding paſſages, and floats, fallings, and proper pieces tinged after the four Elements, and colours of the Rain-bow. Then he conſidered exactly its flowers, according to the condition of each ſtone-work, how and out of what the Iron may moſt conveniently be melted, and what manner of inſtruments may be uſed thereunto, where it may beſt and moſt fitly be wrought; for its Ore affords a threefold ferocity and wildneſs, which are uſeful; as namely, Glaſs-heads, which are like a ſharp blood-ſtone, breaking in the manner of a skull, are ſcaly, and brown ſpiſſie. Secondly, The brown ſtone out of which is made Glaſs, and iron-colour. Thirdly, Granulate iron-filings in the float work; which is ſo hard, that it can ſcarcely be forced to be gotten off, or be brought to right; and when the iron-ſtone is come to its perfectneſs, then it breaketh off by piece-meal, through the Stone, and Rock, that there are found whole mines of iron-ſtone, ſuch is the Iron Ore in *Styria*. The beſt iron-ſtone is black, or red-brown, ſometimes it inclineth to a yellowiſhneſs, ſome is of a Cherry-brown in the floats and ſtocks, ſome are black, and ſmall ſpiſſie, ſome yellowiſh, which glittereth among the reſt, like a Copper ſtone, of a brown black marble, and of a fair Glaſs; ſome looks like ſeparated float work throughout the whole

‘Mine, ſome is cloddy and hoary in clayiſh fields; ‘which only is called the driving, is as the ſand-ſtone, ‘moſt hurtful unto Gold, becauſe it affordeth moſt of ‘the ſlacks, and very little of Iron. Some ſticks in ‘the grey clay, which affords moſt malleable Iron, ‘but is of a browniſh colour. There breaks alſo good ‘iron-ſtone in tartareous and limy Mines; and the ‘moſt running is on the ſtanding paſſages, in criſty ‘ſandy Dalk-ſtones. The groſs clift ſtones break ‘ſome in their ſlats. It uſually breaks alſo in the fore ‘and after Mine-works, where ſome of it lieth off-waſhed among the Roaſts, like a brown earth, and ‘on the day there is no Ore ſo common as the Iron-ſtone; becauſe it aſſumeth, and taketh in other ‘Ores, and ſetteth it thorough: thus often it changeth its colour and nature; after it there enſues Glaſs-heads, Hemaſites, Brown Stone, Oſemund, Bolus, together with the Red Oker, and Iron-ſhell, all theſe ‘aſſume the nature of Iron; and the Iron-ſtone receiveth the higheſt Metals, Gold, Silver, Copper, Tin, ‘Lead, whereby it groweth untoward; but Gold and ‘Silver are not hurtful unto it, they make it malleable; ‘that which is mixed with Copper, or with other poor ‘Metal, eaſily falls aſunder, is brittle; of the ſame ‘condition is Iron flint, producing out of many paſſages an huge flint, partly porous like unto a black ſlat, ‘which beſide the Iron-ſtone, yieldeth another groſſer ‘or ſubtiler Iron. Thus the Iron-ſtone is aſſociable ‘unto other ſtones, be they metalline, or mineral. At ‘*Musbach* there is Copper-ſhot Iron, which hath a ‘Lead joyning thereunto. Founders muſt be expert ‘to deal with ſuch Ores in their melting. Iron-ſtones ‘have in many Countries decreaſed, all other metal-

‘line ſtones are upon their decay, onely Gold, Silver, ‘Copper, and Lead, keep their multiplying condition ‘all the World over.

Chap. XX.

Of the ſeveral ſorts of Iron-ſtone, or Ore, and of Medicines prepared forth of this Metal.

OF Iron there are two kinds, one which is native, being found ſuch in the Mines, the other that which is excocted. The pure Native Iron, that is found ſo, of the *Germans* called **Gediegen Eiſen**, (*Wormius* ſaith) is found in the Mine, either like grains, or a maſs. That which was like a maſs (he ſaith) was found in many places in *Norway*: one kind ſharp, rough, and very porous, tincted without with ruſt; but when it was broken, the genuine colour of Iron did ſhine forth, which alſo within a ſhort time would be covered with ruſt. And that he had lately received ſuch like clods or pieces from *Iſland*. That he had another mineral piece, whoſe third part was the beſt and pure Iron, of which he had a little ſquare portion of the length and weight of an ounce. That it was black, porous, and compounded of ſmall lamels or plates unequally, being diſpoſed like unto Talk, and while it was turned towards the Sun, would ſhew a Violet colour. That there were many other pieces ſhewing the beſt Iron, for the moſt part black of colour, and ponderous, which did not ſtand in need of a

Muſ. Worm. l. 1. Sect. 3. c. 6. p. 123.

Lex Alchym. p.208.

longer deſcription. We ſhall add ſome ſorts of pure native iron to theſe, named by *Rulandus*.

1. Pure Iron, of its own colour, found in its own Vein or Mine, in a white flint.

2. Pure Iron found in *Styria* in the ſand of the Rivers.

3. A vein of Iron at *Giſhubeliah*, of a liver colour, ſolid, pure, and ponderous.

Theſe are the ſorts of Iron found pure, that we in particular can find recorded by any Authors of credit, which may be ſufficient to clear the matter, that pure native Iron may be found, which we commend to all inquiſitive Miners to ſearch after, that they may be able to ſatisfie themſelves, and others of the truth in this particular, ſeeing we have ſeen none ſuch to aver it of our own knowledge.

Now for the ſeveral ſorts of Iron-ſtone, Ore, or Earth, (for there are of all theſe ſorts, that yield Iron plentifully) there are ſo many named by Authors, and alſo ſuch plenty and variety found in his Majeſties Dominions, that we account it needleſs to enumerate them, being ſo commonly and vulgarly known. Only we ſhall ſay thus much, that of thoſe ſorts that we have, or have ſeen gotten in *England*, ſome are of a black colour, and ponderous; ſome more brown, and reddiſh; ſome more yellowiſh, and ſome of a grey whitiſhneſs, that all yield plenty of indifferent good Iron. The Veins or Ore of Iron, when they are excocted, do melt ſo that they may be poured out, which when it is cooled, the droſs and recrements being removed, it is heated in the fire, and doth grow ſo ſoft, that it may be beaten with the hammer, and doth ſuffer it ſelf to be extended into Plates, and ſometimes into very thin ones, as are thoſe that are after covered over with Tin, and called commonly *Long-lane* Tin, and Plate; of which are made very many utenſils for houſhold, and divers other uſes, though they laſt not long, but the Tin weareth from off them, and then the Iron ruſteth, and ſo they ſoon decay. But Iron thus excocted and depurated, is not all of one ſort or goodneſs: for ſome is very tough and limber, which is accounted the beſt; ſome is Copperiſh, rough, or brittle, and frangible; of which they make bullets for Cannons, and cannot commodiouſly be beaten forth with the hammer, but is burſt, and therefore accounted more baſe. Another ſort holds it ſelf in a middle manner, and may in part be beaten forth with the hammer in great Works, in part not. But we here in *England* do for the moſt part make choice of Iron according to the ſeveral uſes men intend it for, and ſo ſometimes chooſe *Engliſh* Iron, ſometimes that which was brought from beyond the Seas, and both of theſe of divers ſorts, which are better known to the Merchants and Mechanicks that work in this Metal, then to me. Now for Steel, which *Paracelſus* makes but the male, and Iron the female; ſome make it to have a proper Vein, or Ore of it ſelf, others to be but the pureſt part of iron, drawn from the other that is more droſſie and earthy: Of which *Wormius* ſaith, Of Iron more often molten and purged, is made Steel; which alſo is brought forth by nature in ſome certain places. Elſewhere Iron is often being hot extinguiſhed in certain waters, that thereby it may be made very hard, but ever thereby loſeth much of its weight.

Muſ. Worm, ut ſupr.

Rulandus tells us, that a pure Vein of Steel, was

Lex. Alchym, p 448,

found in *Voidtland* near to *Fichtelberg*, and alſo that it was excocted forth of a Steel Ore, as alſo drawn forth of pure Iron. Our Workmen at the Forge do uſually diſtinguiſh it into two ſorts; one they call *Coldſel*, and another *Redſel*.

Laſtly, as to this point I ſhall onely mind the Worker in this metal of a paſſage in *Diodorus Siculus*, an ancient Author, who tells us; That the *Celtiberians* did thus prepare Iron to make their weapons of War of. For they hiding Iron plates in the earth, did ſuffer them to be there ſo long, until the weaker part of the Iron was waſted, and the ſtronger remained. Then of that they made Swords, and other Arms for the uſe of the War. To theſe thus made, all things or Arms would yield, that neither ſhield nor helmet, nor any other Armour could reſiſt them. And I have known ſome that have found old ruſty Knives that had long lain in the earth, that being grinded anew, would cut better then the beſt new Knife that could be found. But this I leave to be conſidered of by Artificers. H ſt.l.5 c.9. p.145.

For the medicaments that are by common Chymiſtry prepared forth of this Metal, they are either uſed in outward applications in Chirurgery, or are inwardly adminiſtred. For thoſe that are uſed externally, as the *Crocus martis*, it will in ſome meaſure help to ſtop ſmall Hæmorhages or fluxes of bloud by its conglutinative quality, or help phlegmatick and watery ulcers by deſiccation. Alſo there is an oyl made ſometimes of it, with the help of Salt Armoniack, that is a very fierce and painful Corroſive, but will (for thoſe that can abide it) cleanſe rotten and filthy ulcers, and painful and virulent ſcabs: but this that ſeemeth of an oyly ſubſtance, will with long keeping decay ; and the Salt will ſeparate it ſelf in the form of Water, and leave the parts of the Steel, as a red earth, or Crocus ; becauſe it was but a forced confuſion or mixture, and not an homogeneal union, nor any true oyl from the Steel, but wrought by the ſharpneſs and pungency of the Salt, more then by its own nature, except ſome of the atoms of its Salt might commix with the Sal Armoniack. But there is another oyl of *Mars* to be prepared according to the order ſet down by that learned and experienced Chirurgion, *Felix Wurtzius*, which appeareth in the true form of an oyl, and will ſwim upon the top of water ; that will much honour a Chirurgeon in curing malignant and deſperate ulcers.

Now for the medicaments prepared forth of it by common Chymiſtry, neither the *Crocus* for aſtringency, or ſtaying fluxes, nor the *Aperitive Crocus* (as they call it) for opening obſtructions, will perform half ſo much as they have been commended for. But I rather extol the *Sal martis* (if prepared by a careful and expert Chymiſt) then either of the two former ; a Medicine that ſome of the moſt learned Phyſicians that *England* had, have much praiſed, and have gotten both profit and credit by it. And I am confident that thoſe medicaments drawn forth of this Metal, ſo extremely extolled by *Baſilius* and *Helmont*, were not had but by the help of their univerſal diſſolvent or *menſtruum*, though they do not openly declare as much. For the later of them ſaith thus. And that nothing doth ſo equally gloriouſly work upon the radical moyſture, as the firſt *ens* or Being of Copper; nor that is more benigne, or beneficial to long life, Butler. p 594.

then the ſulphur of Vitriol, which notwithſtanding doth indigitate the ſulphur of the Philoſophers. Compare this with what we have before written concerning the ſulphur of *Venus*.

Laſtly, *Mars*, though moſt vile in price, and deſpiſed by reaſon of a numerous iſſue, notwithſtanding is not reputed by *Paracelſus*, the laſt in a war-like nature. Let this be ſeriouſly conſidered of, and examined.

CHAP. XXI.

Of the deſcription of Lead, its Ores, Mine, Condition, and ſtriking paſſages.

NOw we come to the ſofter Metals, of which Lead is the moſt ſoft of any that is in an hard and coagulated form (not to mention Quick-ſilver that is fluid) and is by the *Latines* called *Plumbum nigrum*, to diſtinguiſh it from Tin, which they called *Plumbum album*; and from *Biſmuth* or Tin-glaſs, which they called *Plumbum Cinereum*, becauſe of its colour. And many accounted theſe three ſorts to be all but Lead, and ſo to differ but in ſome degrees, accidents, and the like: but omitting this opinion, we ſhall handle them as diſtinct Metals.

And this Metal which they called *Plumbum nigrum*, the *Germans* call ſimply **Bley**, and we Lead, without any other addition, and of *Rulandus* is thus largely deſcribed. Lead is a metallick body, livid, earthy, and ponde- Lex. Alchym. p. 263.

ponderous, participating of a little whiteneſs, and hath much of an earthy ſubſtance, and is turned into Tin by lavation, or waſhing. From hence it is manifeſt that Tin is a certain thing more perfect then Lead. And Lead hath more of the ſubſtance of fixed ſulphur to its compoſition then Tin hath. For Lead is an impure body, imperfect, procreated of *Argent-vive*, not fixed, earthly, and feculent, a little white in appearance, but red in ſecret, and compounded of ſuch a like aduſtible ſulphur in ſome part. It wants purity, fixation, colour, and ignition. And to this doth *Encelius* agree word for word, as though *Rulandus* had tranſcribed it from him, as in likelihood he did. *Wormius* deſcribeth it thus: Lead is an imperfect Metal, ſoft, livid, ponderous, not ſuſtaining the fire long, infecting the hands of thoſe that handle it with blackneſs, generated of much crude Mercury, and impure and fœtid ſulphur, and comes neareſt unto Gold in weight and gravity. And *Cæſalpinus* ſaith: For Lead doth imitate Gold in heavineſs, and giveth forth no ſound, therefore they call it mute. I deſire thoſe that have opportunity, exactly to try whether it come near to Gold in weight or not, for I much doubt of it.

Muſ. Worm. l.1. Sect 3. c.7. p.124.

De Metal. l. 3. c.7. p.180.

It is not amiſs here to give the differences betwixt white Lead, or Tin, Biſmuth, Tin-glaſs, or aſh-coloured Lead, and this common Lead, which they call black Lead; according as *Agricola* hath ſet them down: who ſaith; The white Lead or Tin, before it be poliſhed, doth ſhine much; but poliſhed, much more; the aſh-coloured much leſs, the black not at all. The white is more perfect and precious then the black, the aſh-coloured holds the mean betwixt them. The black is moſt eaſily melted, and doth not long indure

Lib. Foſſil.7. p.644, 645.

in the melting-pot, nor conſerve its ſpecies, but is partly changed into that which we call the Spume of Silver, partly into that we call the foam of Lead, or *Molybditis.* The black is ſoft, and therefore moſt eaſily handled, and dilated with the hammer; the white is more hard, the aſh coloured moſt hard of all. The white is tough, the black fragile, the aſh coloured moſt fragile of all. The black doth not give forth any ſound, the aſh-coloured doth ſound, the white doth make a noiſe or craſh. The white is light, the black is ponderous, the aſh-coloured keeps a mean betwixt them. The vapour of Vinegar doth make Ceruſs both of the white and black, being corroded. That white is made of the white, or of Tin, is called *Spaniſh* White, that which is made of the black, is called white Lead, or Ceruſs. Alſo of the black being burned, or calcined, is made a ſort of artificial Minium, ſometimes of an high red colour, which we call red Lead; and ſometimes of a lower yellowiſh red, which we call *Calx Saturni.* The white hath more of drineſs, the black more of moiſture. Therefore of the aſh-coloured and the white, without the mixture of the black, veſſels, or utenſils can hardly be made; but with the mixture of the black they may be made eaſily, as are many and ſundry ſorts, and all our common Pewter. There is alſo made of Tin by calcining, a Powder which the Artificers call *Putty*, of great and excellent uſe for burniſhing or poliſhing any inſtruments made of Iron, Steel, Copper, Braſs, Glaſs, and the like. As alſo a very fine curious powder of a yellow colour, called *Maſticot*, of ſingular uſe for Painters. Alſo that which we commonly *Litharguron*; adding, becauſe that ſome of it is of a white ſilver colour, and ſome of a more

Vid. Agricol l. Foſſil 9 p.651.

more red-goldiſh colour, that it is Litharge (and that, to ſpeak in *Engliſh*, is but ſtone-ſilver, or ſtone of ſilver) of Gold and Silver, when it is known to all experienced perſons, that it is nothing of Gold or Silver, but onely the Lead, that in the ſeparating of the Silver from it, is by the force of the fire, and the Bellows blown into, and (being cooled) hardened into thoſe lumps like ſtones, and may all or the greateſt part of it, be again melted down into Lead as it was before. Now we ſhall ſhew ſomething what *Baſilius Valentinus* ſaith of this Metal, its Ores, and the manner of their paſſages in the earth.

Laſt Will and Teſt. c.7 p.95, 96, &c.

The Lead Ore (he ſaith) is wrought under that heavenly impreſſion of the black and cold *Saturn*, by an undigeſted wateriſh Sulphur, impure Mercury and Salt. Firſt, there is wrought generally a brittle glittering Lead colour in that Ore, which is called Glaſs Ore (the *Germans* call it **Glantz ertz**, becauſe being broken, it is ſmooth and ſhining, though *Agricola* rejects the reaſon of this appellation of his Countrymen; but without reaſon, for they call it not by this name becauſe of its tranſparency, but becauſe it is ſmooth, and ſhining, as that which we call Pottern Ore is) breaking in many rocks, containeth Gold and Silver, yields groſs and laſting Mine-works. Some Lead-ſtones are very broad, becauſe Glaſſie Ores are mixed with it, with flints, or marchaſites, partly they are glaſſie, red-goldiſh, white-goldiſh, ſilvery, Copper-glaſſie, and of Copper. Some Lead Ores turn to a blue colour, mixed with a white tranſparency, like unto a ſhot Bolus; ſome is like unto the Stone-ſalt and Allom; ſome are of a dark green like unto green floats, which lie gritty in a yellow or Glue-coloured clay;

ſome are of a brown black, ſome are yellow-red like Minium, ſome is pure and compact, ſome is inſprinkled and moving, ſome is mixed with Iron, ſome with Silver and Lead, ſome are mixed with Marbles and Flowers, ſome breaks alſo upon ſtanding and level-moving paſſages, and ſome is wrought in pieces here and there in ſlate-Mines, where black Lead lieth along through the whole Mine, ſome is Glaſſie in Lime-ſtones, and ſome is very rich of Silver in huge marble paſſages. There is a two-fold Marble; the ſilver paſſages have an earthly mixed groſs marble, white, red-goldiſh, red-glaſſie, and ponderous. But the Lead paſſages have a ſubtile light, and glaſſie brittle marble, which looks like the glaſs upon Gold Mine-works, is of a curious white glittering quality.

Lead Ore is wrought ſeveral ways, and the colour of it changeth after the manner of the Ores, eſpecially in the ſorts of Glaſs Ores. For if *Saturn* lieth below, or is in ſubjection unto others, then the Glaſs hath no power to bring *Saturn* unto *Saturn*, an imperfect mineral, which either is too hard or elſe untoward; and the *Nodus* of *Venus* is a *Miſpukel*, or a mixture of Lead, and Silver, which is knitted very hard; but if ſoft, then it is Water-lead glaſs, of the which is found in Gold juices, and Tin Ores, a kind of Iron-glaſs, or Iron-mole, but is heavier and more brittle then Iron-glaſs, by reaſon of its terreſtreity or earthlineſs, which keeps in the Metal, and is neither too ſoft nor too hard, and is glaſſie, white-goldiſh, red-goldiſh, and falls into the beſt metalline Ores. True Lead-glaſſes and Ores afford half, or the third part of Lead, mixed with ſome other Metal, and if one of the other Metals be found in the Glaſs, which keeps the predominancy, then Lead paſſages are ſimply good, and Lead is united with Gold, and theſe are mixed ſtones; for the Stones of Mine-Ores are more wonderful in their ſingular accidents.

Thus is here the Lead alſo in its fall, and bleak, after the heavenly impreſſion, which the Higheſt hath ſo indued, that it is ſubject to other Metals, and is the ſupreme Finer in the eſſential fruits of others. It eaſily mingleth naturally with other Metals, and the qualities of other Ores, together with the leaves, bulk and roots, into other ſtones of Earth. And *Saturn* in his degree and power is the higheſt, in a ſingular diviſion of all his Works, in which he ſheweth himſelf in a clarified tranſparent ſoul, runneth into Antimony with its ſweetneſs, which ſhould merely imbrace the Gold: This is done ſo, not without a cauſe, for in its ponderoſitie it yieldeth the lighteſt remedy to all melancholy and heavy bloud. As heavenly Aſtrals are ſeveral, the clouds under them are of all ſorts of colours; ſo the one Lead is purer and more malleable then others, as that in *England*, and at *Villach*; it is ſeen in the Lead-ſtones alſo.

For Lead Ores which are mixed with other ſtones, eſpecially with ſuch as contain Silver, Iron, or Copper, yield much of light ſtones and Lead work, which are pickt out for ſeparating, and the rather if they be rich of Gold. Such worthy Metals there are in *Hungary*; leſs pains are taken about them in their fining mineral flints with their unripe juices in the weak joynings of Lead Ore, unite the Saturnal Glaſs; if without any mixture, affords to Potters a green glazure, if all be not melted into Lead: but if you get a brittle mixed flint, there the glaſs is half upon Iron, and ſuch that are moſt pliable afford melting glaſs, for fining ſuch ſturdy wild Ore, which will not melt. Artiſts may prepare ſuch Saturnal glaſs, mingling with it a ſmall quantity of metalline flowers, which will look as fair as if it were a natural one. There may be extracted from Lead an effectual medicine for Mans health.

If ſlate Ores are found with another mixture, there are generated moſt fix and firm Copper, Vitriol and Calamy alſo, as they are at *Goſlar* in *Harlynia*. The beſt Lead is in *England*, and at *Villach*.

Man cannot well be without any of his members; Metals according to Gods Ordinance are of the ſame quality, if Man knew to make good uſe of them; for Nature hath provided richly for him in that way: if men work theſe ignorantly, what utility can they have of them? Of the metalline Soul is made a chain which linketh together the junctures of Gold and Silver: theſe are indued with a ſpecial ſpirit, which is diſtilled into a Water, through a tranſparent head. Nature congealeth under ground in the paſſages ſuch Water into Ice, for a ſign that there is at hand a Vein of Lead, and Silver, or of pure Lead; and if there be a mixture of other Metal about it, it is the better.

The beſt Lead paſſages are ſuch Waters, blue, ſcaly, Talky, ſlate ſtones and fluid ſtreaked Marbles at length, or curled inſprinkled ones, and not wrapt or wound about with moving paſſages, almoſt not unlike unto Silver Ores. Some Lead Ores are of a white, ſcaly, Talk-ſlate, full of wild Granats, in which Lead Ore doth appear, which is rich of Silver.

If the Reader think we have been tedious in tranſcribing ſo much forth of *Baſilius*, he may very well be-

believe it was not done without cauſe, neither in reſpect of the common Miner, nor of the myſtical Philoſopher, for there is matter enough for them both, if they ſeriouſly weigh it, and can penetrate the depth of his meaning, which I commend to them both heedfully to ponder and judge of.

Chap. XXII.

Of the ſeveral ſorts of Lead Ore, their Coats and Matrixes, and of Medicines prepared forth of this Metal, and of ſuch things.

Lead hath ſuch ſeveral ſorts of Ores, and is accounted ſo baſe a Metal, that few Authors have given deſcription of them. But we ſhall note ſuch as we find, and add thoſe ſeveral that our own Country yieldeth.

Lex. Alchym. p. 365.

Rulandus reckoneth theſe: 1. Lead Ore, of its own colour, but impure.

2. A vein of Lead among the *Ubii*, that is whitiſh like unto white Spar or Fluor, that is not pellucid.

3. A Vein of Lead that is like to tranſparent Spar, or Fluor, which is very rich; for forth of an hundred pound weight, they draw above ſixty pound of Lead.

4. At *Caldeborn*, like unto aſh-coloured Marle.

5. Like unto a white Sand-ſtone.

6. Like unto a metallick flint, in which little veins of live Sulphur appear, and forth of *Poland* mixt with native Oker.

The experienced *Ercker* enumerateth theſe ſorts.

Lib. Mineral. 4. p. 113. 1. That which the *Germans* call **Glantz ertz**; and it is commonly called, or rendred Glaſs Ore, or Glaſſie Ore, that is, that hath a fine ſhining gloſs, and is ſmooth; not becauſe it is tranſparent as Glaſs: and this is often rich, and holdeth more then half Lead.

2. Alſo a white Lead Ore, which they call **wieſs Bley ertz**, like unto a Sand-ſtone.

3. Alſo a red Lead Ore, which they call **Rot Bley ertz**.

4. Alſo yellow Lead Ore, mixt with grey; alſo found in Pebbles, which they call **Kieſs**.

For the Ores of Lead that are gotten in *England*, they are very many and of divers ſorts, Mr. *Boyl* reckons theſe, Frim Ore, Steel Ore, Pottern Ore, &c.

And I ſhall number up ſome of the ſorts that I have either ſeen, or that I keep by me.

1. And firſt, That which the Workmen commonly call Potters Ore, becauſe therewith (being beaten to powder) the Potters do glaze their pots, of a greeniſh, pale blewiſh, or browniſh colour: and this Ore is hard and brittle, of a fair ſhining glaſs or gloſs, and is (as I conceive) the very ſame that the *Germans* call **Glantz ertz**, and is eaſie to be broken with the ſtroke of a ſtone, or hammer, and doth commonly break into ſmaller ſquare pieces; wherefore ſome of our Miners do call it Dice Ore: and this is generally the moſt rich of Lead, and eaſie to be molten.

2. The Ore that they call Steel Ore, either of its blackiſh dark colour like Steel; or becauſe of its hardneſs, being more hard then any other ſort of Lead Ore, and very ponderous, and ſometimes containeth ſomething of Silver in it, and is ſo hard to melt, that

they are fain to mix two or three ſorts of the ſofter Ore with it, to make it run, or melt the more eaſily, and this oft containeth ſtore of Lead in it.

3. The Ore that they call Frim Ore, is that which is very brittle, and will almoſt crumble with the hand like a Sand-ſtone, of a whitiſh or grayiſh colour, and ſometimes of other colours, and holdeth not ſo much of Lead as the former.

4. Soft Ore, that is near the colour of Lead it ſelf, and is far ſofter then any of the former; inſomuch that ſometimes in beating it bruiſeth, and ſpreadeth abroad with the hammer, ſo that the Workmen are fain to mix much of the harder ſorts with it, otherwiſe they could not get it beaten ſmall enough for their purpoſe; and this ſort often containeth good ſtore of Lead.

5. There is Ore of Lead that lieth inſprinkled in Spar, Cauk, or grayiſh ſtones in ſmall grains of a bright colour like ſilver, and yet containeth very little of that Metal in it, but holdeth very well of Lead; and of this ſort there is very much gotten in theſe Northern parts, and ſo there is of all the other ſorts.

There is beſides theſe named, which may have many ſubdiviſions, and are of exceeding great variety, a ſort of Ore found in the Lead Mines, that looks well, and in appearance is like other Lead Ore, but yieldeth no Metal at all, but being mixt with good Ore, doth rather hurt and conſume it. And this the Workmen (if they mean to melt their Ore themſelves, and not ſell it) pick forth, and ſeparate it from the good Ore: but if they mean to ſell the Ore when beaten and waſhed, then they beat and mix this with the good Ore, and oftentimes Spar or Cauk beaten with it, which this kind of barren Ore will in the waſhing colour of a leadiſh hue, and ſo doth augment it in bulk and weight; but then it yields not ſo much Lead in the fuſion, as in proportion the Ore would do, if it were ſeparated from it. And this kind of barren Ore our Miners commonly call blue Blindake, and I judge it to be the ſame that the *Germans* call **Blend**, which they ſay is barren, and containeth no Metal in it all.

Here it cannot be amiſs to ſay ſomething of that which we commonly call Black-Lead, becauſe it diſcoloureth the hands far more then common Lead, and is that whereof Pencils are made for Painters and Scriveners, and many other ſuch like uſes. In the North we uſually call it Kellow, and ſome call it Wadt; of which there is ſtill a Mine near *Keſwick* in *Cumberland*, which is opened but once in eight or ten years; either by reaſon of its ſcarceneſs, or to keep up the price of it, of which learned *Cambden* ſaith thus: Britan. p. 767. Here alſo is commonly found that mineral kind of earth, or hardned glittering ſtone (we call it Black Lead) with which Painters uſe to draw their lines, and make Pictures of one colour in their firſt draught: which whether it be *Pingitis* or *Melanteria*, ſpoken of by *Dioſcorides*, or Oker, a kind of earth ſo burnt with heat, that it becometh black; or whether it were unknown to the old Writers, I cannot certainly aver, and let others for me ſearch it out. But I am perſuaded with Dr. *Merret*, Rer. natural. P nax. p. 218. that the Ancients had no perfect knowledge of it, however they left us no clear deſcription of it, nor no peculiar name for it, and therefore he not unfitly ſtiles it *Nigrica fabrilis*.

The Ores that are commonly gotten in theſe parts lie either diſperſedly, which ſome call floats, ſome looſe or ſhaken Ore; and this is for the moſt part in black bituminous earth, or in yellowiſh red clay (which ſome call the Brown Hen, and then ſay her blue Chickens are not far off) Marle, and among ſmall ſtone; or in a continued courſe, or line, which ſome call ſtrings, ſome veins, which commonly lead to a greater ſtock or trunck; and theſe are encloſed ſometimes in one ſort of Coat or Matrix, and ſome in another. In *Darbyſhire* theſe commonly lye near the Lead, Cauk, Baſtard Cauk, Black Chert, Wheatſtone, Sheaf. In theſe Parts moſt uſually in Spar, or in Cauk, or in Flints, Slates, and other kind of Stones of divers colours, but moſt-what of a grey or aſh-colour. The Spar is ſomething tranſparent, the Cauk not ſo, but more ponderous, and both help the fluxing of the Ore.

Ut ſupra

For Spars which the *Latines* call *Fluores*, the *Germans* **Fluſſe**, they are Stones found in the Mines like unto Gems, but leſs hard. The Miners call them *Fluores*, becauſe with the heat of the fire, as Ice by the Sun, they melt and flow. And they are the rudiments of Gems, and the like, and are of theſe ſorts.

Lex.Alchym. p.217, 218.

1. Of a Red colour, and ſeem at the firſt view crude red ſilver Ore, although this be ſometimes tranſlucid. They look alſo like Carbuncles, but though perſpicuous they ſhine more faintly. And thoſe that are not tranſparent, are by that diſtinguiſhed from Carbuncles; but the *Fluores* or Spars, as ſoon as they feel the fire they flow; but Carbuncles will not melt with the fire.

2. Of a dilute purple colour. They look like the more greeniſh Amethyſts, ſuch as are found in many

places in *Bohemia*, and are not very much unlike them; and therefore many are deluded by them.

3. Of a white colour like Cryſtal.
4. Of a yellow colour like a Topaz.
5. Of an aſh-colour.
6. Of a very black colour.

And of all theſe ſorts, and ſome more, he reckoneth many diverſities and differences both in colour and figures. To whom and *Wormius* we refer the Reader.

As for Spars or *Fluores* either tranſparent or not, I ſhall recite ſome ſorts, ſuch as I have in my cuſtody.

1. And firſt I have divers ſorts that are white, and very tranſparent, like the coarſer ſort of Cryſtal, and in ſome of them the Rudiments, as it were, of Diamonds growing in them, finely angled, and more bright then the Spar in which they ſeem to grow.

2. I have ſome that is black as Jett, with fine angled and pointed Diamonds, (if I may ſo call them) of the ſame colour, that notwithſtanding the blackneſs, will againſt the light ſhew a kind of luſtre, or reſplendency.

3. I have Spar purely tranſparent, that is of a fair blue sky-colour, very delightful to the eye.

4. And ſome of the very colour of the Amethyſt, that if poliſhed, and ſet in Rings with a right ſoyl or water, were able to deceive a very skilful Lapidary.

Now though we have ſpoken ſomething before concerning *Gur*, that is a peculiar mineral juyce, and little know nor enquired after; we ſhall here add ſomething concerning the *Medulla lapidis*, or *Lapidea*, which the *Germans* call **Stein marck**; ſome of which is agreeable to the *Gur*, or of its nature, and ſome of a different temper; of which ſorts *Rulandus* reciteth theſe.

1. Of a white and fluid kind, which was found in the Rocks of *Torgenſe*.

2. A ſort that is white and fatty, found in the ſame place.

3. A white metallick matter growing in the Veins of ſilver, which when it is firſt taken forth, it is in colour like liquid Cheeſe, but forthwith in the air it waxeth hard, ſo as notwithſtanding, being holden in the mouth, it melteth like butter.

4. A ſort that is a metallick ſubſtance moſt white, fat, and ſoft, found in the Iron Mines of *Sachſenfield*; and in touch not unlike to that which is called Soap-ſtone or Earth.

5. A red ſoft matter, found in the Mines of *Rochlicenſe*, which they uſe with great profit, in ſtead of *Bole* of *Armenia*.

Laſtly, As for Medicaments prepared forth of Lead, there are ſome ſtore uſed in Chirurgery, as Litharge of both ſorts, Ceruſs, Red Lead, *Plumbum Uſtum*, and the like, which are common and vulgar.

For Medicaments prepared forth of Lead by common Chymiſtry, I know none of any value, (and that by the opinion of the moſt of them, except *Hartman*, not to be taken inwardly) is that which they call *Saccharum Saturni*, which I confeſs in inflammations and the like diſtempers, will do very handſom and commendable things. But yet if we will believe *Ripley*, *Lully*, and ſome others, we might be induced to believe that in this Metal there are contained far more noble ſecrets and Medicines: For *Lully* tells us this in few words. *Scire debes quod ex plumbo Philoſophorum extrahitur oleum quoddam aurei coloris, vel quaſi, cum quo ſi lapidem mineralem, vel mixtum, vel anima-*

Epiſt. Accurrat. p. mihi, 371.

lem poſt fixionem primam ſolveris tribus vel quatuor diebus, vel vicibus, excuſabit te ab omni labore ſolutionum, & coagulationum. Ratio eſt, quia hoc eſt oleum occultum, quod facit medicinam penetrabilem, & amicabilem, & conjungibilem omnibus corporibus, & augmentat ejus effectum ultra modum ſic, quod in mundo hoc, ſecretius eo non eſt. But there is a learned French Author (who for ſome reaſons we ſhall not name) that deſcribeth the drawing of an Oyl of extraordinary vertue forth of this Metal, and giveth *Lully*'s words in a ſhorter ſenſe thus. *Ex plumbo nigro extrahitur oleum Philoſophorum aurei coloris vel quaſi, & ſcias quod in mundo nihil ſecretius eſt eo.* This is enough for thoſe that do, or can underſtand, and therefore we ſhall add no expoſition. And *Ripley* ſaith thus;

XII. Gates Prefac.

An Oyl is drawn out in colour of Gold,
Or like thereto, out of our fine Red Lead.
Which Raymond *ſaid; when he was old,*
Much more than Gold would ſtand him in ſtead:
For when he was for age nigh dead,
He made thereof Aurum potabile,
Which him revived, as men might ſee.

Compare this with the Latine quoted by the aforeſaid *French* Author, and with the Latine ſet forth by *Combachius*, and ſome paſſages in *Ripley*'s *Medulla*, and then (perhaps) the truth may be more apparent. But that we may ſharpen the appetite of the ſtudious ſearchers into the ſecrets of myſtical Chymiſtry, we muſt affirm that neither the ancient Poets nor Philoſophers did ſpeak ſuch great things of *Saturn* and his off-ſpring, without juſt and great cauſe, whatſoever the moſt cenſorious Critick may ſay to the contrary; and the reaſons are ſufficiently known to the Secretaries of Nature, and for others they may be as well contented with the Husk as the Kernel. And that I may put thoſe that are inquiſitive into a more ſerious ſearch in this particular, I ſhall commend unto them one *Stanza* of that which ſpeaks Sir *Edward Kelley* a learned Adeptiſt, and not ſuch a perſon as *Weaver* in his Funeral Acts and Monuments would perſonate him to be, miſtaking the one born in *Worceſterſhire*, for the other born in *Lancaſhire*, and hardly to be reconciled by any near touch of Chronology, nor other circumſtances; who after he hath ſpoken candidly enough to the Sons of Art, ſaith thus:

Theat. Chym. Brit. p.333.

Remember alſo how the gods began,
And by deſcent who was to each the Sire,
Then learn their Lines and Kingdoms if you can,
Their manners eke, with all their whole attire.
Which if thou do, and know to what effect,
The learned Sophies will thee not reject.

But to knit up this diſcourſe (which ſome may deride, which we ſhall leave to their own extravagant fancies) we ſhall give you the teſtimony of two eminent perſons, of the ſecrets contained in this Metal. And firſt that of *Paracelſus*, who though a dark Author (as many account him) yet few come more cloſe to the mark, whoſe words are theſe, where he maketh *Saturn* ſpeak of himſelf: *Mundo minime foret utile, ſi cognoſceret, aut ſaltem crederet, quidnam in me lateat, efficereque poſſim: utilius foret, ſi mecum id, quod poſſum facere calleret: Alchymiſtarum artes omnes deſerens,*

Cœl. Philoſ. p.122.

rens, hoc ſolo, quod in me eſt, & per me fieri poteſt, uteretur.

Butler p. 594. Laſtly, to bring up the Rear, as a moſt ſtout Champion, we ſhall give the witneſs of the experienced Adeptiſt *Helmont*; who having ſhewed the difficulty to obtain medicaments forth of Gold, Silver, common Mercury, ſaith thus: *Sunt ergo præterea quatuor Metalla, quæ facilius ductui, & optatui artificum parent. Adeo ut non fruſtra Paracelſus glorietur, ſolo plumbo, forte ducentas morborum Claſſes ſuperari poſſe.*

CHAP. XXIII.

Of the deſcription of Tin, *of its Ores, Operation, Stocks, Floats, Fallings, and ſtriking Paſſages, and the like.*

IT ſeems that betwixt the *Stannum* or Tin of the Ancients, and that which later Authors call *Plumbum album*, White Lead, which now is taken to be our common Tin, there are many that have made a difference. But if there were any ſuch thing, it is now unknown, therefore we ſhall ſay nothing of it, but proceed to that which is commonly known by that Muſ. Worm. l. 1. Sect.3.c.7. p.124. name, which *Wormius* thus deſcribeth. Tin is an imperfect Metal, ſoft, and conſiſting of a plentiful Mercury, leſs fixed, and of a white impure Sulphur; of more difficult fuſion then Lead, ſcarcely contracting ruſt, and will ring, or make a ſound.

Rulandus thus, Tin is a metallick body, white, not pure, livid, participating of little earthlineſs, of *Argent-vive*, pure fixt, and not fixt, clear and white in its outſide, and red in its inſide, and of ſuch a ſulphur, it onely wants decoction or digeſtion.

Lex. Alchym. p. 445.

Baſilius writeth thus of it. Tin Ore is wrought in a Sand-ſtone, having its influence from *Jupiter* above, wrought of a dark brown purple coloured, grayiſh, black, ſhining mercurial ſalt, and ſome ſulphur mixed with it, interlined with an unkind groſs ſulphureous fume; all theſe incorporate together, making the body of Tin. This unkind fume is the cauſe of the brittleneſs of Tin, and maketh all other Metals that are melted with it, unkind and brittle. This Tin or Quitter groweth or breaketh in a threefold manner, *viz.* it ſlideth, it is full of fumes, and it groweth in pieces. It hath a threefold wildneſs alſo, as Shoal, Flint, and Iron-mold, which cauſeth Lead-works. Their colours are black ſlate, brown, and yellow. Theſe Sand and Quitter Ores, are environed or incloſed in mighty broad ſtanding paſſages, which appear to the day with Quitters: ſome contain alſo rich paint-work, ſome of theſe flints muſt be calcined, ſome are mixed with ſtore of Talk and Cat-ſilver, which is a food unto Quitter, and loveth to ſtay there; ſome there are which groweth in a Glimmer, or Cat-ſilver, and is Iron-mold; others alſo do ſtrike in a Fire-ſtone or Flint, ſo that fire muſt be applied thereunto, others are in a ſoft ſtone, and as it were ſwimming along: ſome are richer then others. That which groweth pure, and in black ſmall ſtones, and heapeth together that natural work, that giveth the greateſt gain. And becauſe *Jupiter* is the potent Lord of it, therefore it hath a mighty Throne and ſeat, that is, a mighty huge

Laſt Will and Teſt. c. 8. p. 99, 100.

Mine-Ore, out of which Tin is made by heaps, and is of that nature and property, that it preſſeth outward, and bloſſometh to the day, thruſteth off Soap-work, whence come the waſh-works of Tin-Soap. For Quitter doth not grow in the ſand of Earth, beſides in its body it is removed further from the ſeat of its Throne to the Foot-ſtool, maketh for it ſelf a two-fold dominion; in one it bordereth, and reacheth to ſlates, and other ſtones that lie about it, inſomuch that his dominion increaſeth; in which is not a little, but much on the blue ſtones, fallings, floats, paſſages, ſhoals, and clifts, which incline one upon another, and do joyn. Many times a mighty Tin-ſtone is wrought, which ſinketh down among its own cinder and ſlate, and at its ſinking purgeth it ſelf, and there come other fumes like clouds, which at all ſides ſhoot into, and then breaketh again as good as ever it did before; and it is of that good condition, that it deſpiſeth no lodging, nor paſſeth by any; but as poor and as deſpicable the ſtone is in that place, be it red, brown, freſh, or ſtale, broad or ſmall, it will preſs into, and mingle it ſelf with it, and will not be forced out of it, making it ſelf great, little, groſs, mild, tame, ſubtile, and pliable, even as the reſt will have it, and all this in a natural way. It loveth to border upon Silver, and Iron-ſtone, that Tin and Iron be united in a mighty fixt Silver and Copper Ore; all which are found at their ſeveral marks. Tin Ore is in this place better and malleable; if found afar off from flint-paſſages, and are leſs mingled with Iron-mold, eſpecially of Copper-ſtones, which in calcining can hardly be ſeparated, proves Lead-work, without any fair glaſs. Some of it is ſo mild and ſoft, that when they are cleared, and calcined, ſtill loſe ſomething; for flints and ſulphureous matters which are volatile, and cannot indure any great heat; corrode ſomewhat of the metalline Tin, which appeareth by the white thick fume, at the calcining. They are calcined thus hard by reaſon of Bake-Iron, elſe they might yield as much again, for they loſe extreamly in calcining. It is ſtrange to ſome why they ſhrink together to ſo ſmall a quantity, being they get a greater quantity of Lead, with good Qwitter, at firſt brought out of the Mine.

As for the ſeveral ſorts of Tin Ore, I find little mention of them in Authors, onely Doctor *Merrett* ſaith that the Mine-men in *Cornwal* and *Devonſhire* do diſtinguiſh their Tin into that which they call Pyran, Murdick, and Block Tin, and that they call their Tin-ſtones Shoad. And the learned Mr. *Boyl* doth tell us, that ſtore of excellent Tin is ſaid to be found in ſome parts of *Cornwal*, at the ſides, and in the channels of running waters, in grains like Sand or Gravel, which they call Corn-Tin.

Rer. natur. Pinax.p.208.

Philoſ.Tranſ. n.19.p.337.

Now for the Tin Mines in *Cornwal* and *Devonſhire*, which have been ſo ancient, that it may well be an argument that Nature neither decays, nor that Minerals ceaſe to grow, take what learned *Camden* ſaith in theſe words. The Inhabitants do diſcover theſe Mines by certain Tin ſtones lying on the face of the ground, which they call Shoad, being ſomewhat ſmooth, and round. Of theſe Mines or Tin-Works, there be two kinds, the one they call Load-Works, the other Steam-Works. This lieth in lower grounds, when by trenching they follow the Veins of Tin, and turn aſide now and then the ſtreams of water coming in their way:

Brit. Cornw. p.185.

That other is in higher places, when as upon the hills they dig very deep pits, which they call Shafts, and do undermine. And a little after he ſaith, There are two ſorts of Tin, Black Tin, which is Tin Ore broken and waſhed, but not yet founded into Metal, and white Tin that is molten into Metal; and that is either ſoft Tin which is beſt Merchantable, or hard Tin leſs Merchantable. And again: That the ancient *Britans* practiſed theſe Tin-works (to omit *Timæus* the Hiſtorian in *Pliny*, who reporteth, that the *Britans* fetched Tin out of the Iſle *Icta* in Wicker Boats, covered and ſtitched about with Leather) appeareth for certain out of *Diodorus Siculus*, who flouriſhed under *Auguſtus Cæſar*. For he writeth, that the *Britains* who inhabited this part, digged Tin out of ſtony ground, and at a low Water carried the ſame in Carts to certain Iſlands adjoyning.

Now I ſhall give the Reader ſuch informations as I received from one *Thomas Creber* of *Plimpton St. Mary* in *Devonſhire*, who was one (and all his Anceſtors before him) that had wrought in the Tin-mines; and theſe particulars I had from him.

1. The Hills where they get Tin Ore, near that place where he lived, are called *Telsborrow* and *Woollack*.

2. Black ſtones that hold Tin, they call Tin-ſtones, and lie either in a load, or in a ſtring.

3. There is other Tin Ore that is ſofter, and lies in a dun ſtone, and is of a yellowiſh colour, but will melt neer both alike.

4. Pure Ore, which they call Corn Tin, being found in grains, and is the hardeſt to melt.

5. Another place they call *Armed Pit*, which holds

Ore they call *Zill-Tin*, which is as ſmall as Grit or Sand, and needeth nothing but waſhing, and is the moſt eaſily melted of all other ſorts of Tin Ore, and lieth in Chalk and Clay; and this ſmall Ore, becauſe it is rich, they call it fatty Ore.

6. The black ſtones, if they find them at the top, do continue in the whole Mine or Work. Sometimes it is in that they call ſtrings, running through earth, or ſtones, like ſmall twigs or ſtrings: and ſometimes it is all in one, like a great branch or trunk, which they call a Lode. Sometimes it runneth in Spar, ſometimes in a black ſtone that will ſtrike fire, ſometimes in white-ſtones that are ſoft.

7. Their ſmelting houſes roofs, after certain years they pull down, and find ſtore of Ore in that ſtuff, that in their former meltings was forced from the fire.

8. The Corn Ore is found at the bottom of the Hills, being there digged into, and lieth ſometimes in one ſort of earth, and ſometimes in another. And the Zill Ore is found in the ſame order.

9. The uppermoſt part of their Work they call Cooping; and if it be good or rich, the Lode or Strings underneath are good: If bad or indifferent, thoſe underneath, are ſometime good, and ſometime bad.

10. They call that part of the mineral, that is found waſhed down, or otherwiſe brought down into the Valleys, Shoad.

11. They have a thing they call Mundick, ſometimes found in the Ore, which they ſeparate leſt it ſhould ſpoil the Ore; ſome of it is yellow, which is the worſt, and ſometimes of other colours: and the Mundick after ſmelting the Ore, is blackiſh and hard. Of it Mr. *Boyl* ſaith thus. Mundick I have had of a Philoſ. Tranſ. n. 19. p. 337.

fine

fine golden colour; but though it be affirmed to hold no Metal; yet I found it in weight, and otherwiſe, to differ from Marchaſites, and the Mine-men think it of a poyſonous nature.

12. They have a thing they call *Maxy*, mixt with the Ore, which cannot be ſeparated by the water, but by the fire, and then ſmells very ill, and is of a blewiſh colour.

13. Laſtly, They alſo find ſomething like bright Ore, which they call *Shim*.

And thus much of this Metal, ſeeing there is no need to ſpeak of any Medicaments prepared forth of it, becauſe I have not had experience of any ſuch.

CHAP. XXIV.

Of the ſeveral ſorts of Mercuries according to the Myſtical Philoſophers, or Adeptiſts.

Though I may be cenſured variouſly by ſeveral ſorts of men for intermeddling in ſuch a myſterious and high a ſubject as this Chapter importeth; yet without valuing them, I ſhall lay open ſome things that have not been much noted, or underſtood by many that think themſelves ſufficiently knowing in theſe matters, and leave them to thoſe, that with me do underſtand the Authors from whom I have theſe things I now treat of; being aſſured that theſe things are not for thoſe that are led by fanſie and opination, but for thoſe that are underſtanding, and the genuine Sons of *Hermes*. I find in the heedful and diligent ſearch of the Writings of that profoundly learned, and experienced perſon *Paracelſus (abſit invidia verbis)* that he underſtood four ſeveral ſorts of Mercuries, which we ſhall rank in this order, and ſo handle them.

1. There is the Mercury of the Philoſophers, which is a thing in a various ſenſe, *Mercurio vulgi communius*.

2. There is that which he calleth *Mercurius Corporis*, which is made *aſtraliter* by the Tincture forth of another Metal, as when Lead, Tin, or Copper is tranſmuted into true running common Mercury, or Quickſilver; or it may be (as *Libanius* recordeth of *Kelley*) that common Gold is changed into Quick- Rer. natur. l. 9. p. 113.

ſilver; of which he thus ſpeaketh. *Sic etiam Mercurius Corporis è metallo alio factus aſtraliter, multo nobilior, & fixior eſt Mercurio communi.*

3. There is *Mercurius Metallicus*, or *Corporalis*, that is extracted, drawn and ſeparated from the perfect or imperfect Metals; as is that mercurial part of Copper mentioned by *Helmont*, after the external and combuſtible ſulphur be ſeparated from it, which may be reduced into a white and anonymous Metal; and this not to be had but by the help of the Alkaheſt.

4. The vulgar Mercury, or common Quickſilver.

And of two of theſe we ſhall ſpeak, to wit, of the Philoſophers Mercury, and of common Quickſilver.

I. 1. Concerning the Philoſophers Mercury, we would admoniſh the ſtudious ſearcher after Natures Secrets, that theſe kind of Authors did not write to ſuch ends and purpoſes as the moſt of other Authors did, plainly and openly to reveal their Art; for it was not lawful for them ſo to do, and that for weighty reaſons known to themſelves, and not fit to be divulged. But to declare the truth in riddles and parables; therefore let them take this rule from a learned Author, who ſaith thus: Let a Lover of Truth make uſe of a few Authors, but of beſt note, and experienced Truth; let him ſuſpect things that are quickly underſtood, eſpecially in myſtical names and ſecret operations; for truth lies hid in obſcurity, nor do Philoſophers ever write more deceitfully, then when plainly, nor ever more truly then when obſcurely. And therefore *Geber* tells us, *Ubicunque aperte locuti ſumus, ibi nihil diximus, ſed ubi ſub Ænigmate aliquid poſuimus, & figuris, ibi veritatem occultabimus.* Again,

Arcan. Herm. p.168.

Let the ſtudious Reader diligently mark, in what points they agree in, for there neceſſarily the truth is to be found, for Concord is the ſtrongeſt evidence, and Truth conſiſts onely in unity. For *Treviſan* ſaith, *Conſideravi potius quibus locis, libri maxime convenirent in eundem ſenſum, ibidem exiſtimavi latere potiſſimum veritatem, quæ non poteſt in pluribus, ſed in uno tantum exiſtere: hac viâ mihi facta eſt obviam veritas: In quibus enim maxime convenire videbam in unum, hoc ipſum fuit, quod tam anxie quæſieram.*

Bern. Treviſan. de Alchym. p. 756.

Laſtly, obſerve this. Let the ſtudious Reader have a care of the manifold ſignification of words; for by deceitful winding, and doubtful, yea, contrary ſpeeches (as it ſhould ſeem) Philoſophers vent their myſteries, with a deſire of keeping and hiding, not ſophiſticating or deſtroying the truth. And in nothing have they been more dark and obſcure, then about this that they call their Mercury; which they have made manifold; four ſorts of which we ſhall onely handle.

Arcan. Herm. p.72.

Ut ſupr. p.188.

1. They do ſometimes call perfect Elixir, and colouring medicine their Mercury (though with ſome impropriety, as to other appellations of it, being perfectly fixt, and not volatile) becauſe of the likeneſs and great conformity it hath with heavenly Mercury, or with the Planet ſo called, which accommodateth it ſelf, to the nature and quality of every thing it is joyned withal. The like this uncertain Elixir worketh, for that being tied to no proper quality, it imbraceth the quality and diſpoſition of the thing wherewith it is mixed, and wonderfully multiplieth the vertues and qualities thereof. And in this ſenſe for the moſt part the Philoſophers underſtand it, and not in

Nov. Lum. Chym. Tract. 6. p. 320, 321.

reſpect of common Mercury, or its volatility. For *Sendivogius* ſaith thus: *Dicitur Mercurius propter ejus fluxibilitatem, & uniuſcujuſque rei conjunctionem, non propter eſſentiam, aſſimilatur ſulphuri propter internum calorem, & poſt congelationem eſt humidum radicale.* For the Philoſophers Sulphur or Tincture before Fermentation is (in this ſenſe) truly mercurial and univerſal; but after it be fermented, that univerſality is determined, and ſpecificated according to the nature of the Metal with which it is fermented, and ſo it is no more an univerſal, but a particular. *Et ante fermentationem tamen eſt catholica ac univerſalis vere, & in omnia ſublunaria agit univerſaliter, & catholice. Poſt fermentationem autem eſt ſpecificata ad naturam metallicam.* And again; *Et eſt vere univerſalis antè fermentationem, poſt eam ſpecifica.*

Theatr. Chym. Vol. 4. p. 471, 472.

2. There is another matter which they call their Mercury, which is the moſt univerſal that is in nature, and forth of which in the firſt creation all ſpecificated bodies were produced, and ſtill continueth both the efficient and material cauſe, and matter of all generations, and productions, and this they called Hyle or Chaos, and *Raymund Lully* the *genus generaliſſimum* of all things. And doubtleſs was no other then *Ariſtotles materia prima*, fift Eſſence, or fift Element, which few of his Interpreters underſtood, and many others derided, as though becauſe they did not know it, therefore others did not: when indeed that learned *Græcian* underſtood much, that in his Writings he opened but darkly, and therefore however the proud and ignorant may ſcoff and jeer, we do affirm that there is ſuch a matter *in rerum natura*: though in ſome reſpects it be a truth, that it is, *neque quantum,*

neque quale, neque quid, neque quicquid eorum, quæ cernuntur; and this the ancient Sages knew and underſtood well enough, and ſometimes called it *Anima Mundi*, or *Spiritus Catholicus*, and by many other ſuch like names. And it is of this that the learned Lord of *Nayſement* epitomized by *Combachius*, writ that learned Treatiſe, *De vero Sale ſecreto Philoſophorum, & de univerſali mundi ſpiritu*: who ſaith in one place thus; *Ego vero tracto de materia univerſali nondum ſpecificata, quæ proprie materia prima hujus materiæ primæ metallicæ appellari poteſt, tanquam generaliſſimum genus generum, à Raymundo Lullio adeo celebratum.* And as the Philoſophers did underſtand this to be the firſt true matter of all things, ſo they had an univerſal matter that was mineral, from whence all Metals did ſpring and ariſe; ſo that by alluſion and compariſon, they often expreſſed the nature of the one by the other; which many (and they very learned too) not diſcerning the confounding of theſe two together, have often taken the one for the other, and ſo have both been deceived, and alſo deceived others; of which thing learned *Ripley* giveth us this caution:

De ſal. Philoſ. c. 4. p. 158.

In the beginning when thou madſt all of nought,
A Globous matter, and dark under confuſion
By the beginner marvellouſly was wrought,
Containing naturally all things without diviſion,
Of which thou madſt in ſix days dear diſtinction.
As Geneſis *apertly doth record,*
Then Heaven and Earth perfected were with thy Word.

The 12 Gates Prefac. p. 122, 123.

So thorow thy will and power out of one maſs
Confuſed, was made all things that being is;
But in thy glory afore as Maker thou was,
Now is, and ſhall be without end I wiſs;
And purified ſouls up to thy bliſs
Shall come a principle, this may be one,
For the declaring of our Stone.

For as of one Maſs was made all thing,
Right ſo muſt it in our practice be;
All our ſecrets of one Image muſt ſpring,
In Philoſophers books therefore, who luſt to ſee,
Our Stone is called the leſs World, one, and three.
Magneſia *alſo of Sulphur and Mercury,*
Proportionate by nature moſt perfectly.

Here the careful Reader may obſerve, not onely the deſcription of this matter that he calleth Globous, known, and underſtood of ſo few, as alſo the compariſon of it, to the matter of their great Stone.

3. The matter forth of which they prepare their artificial Water, they call their Mercury; which thing Nature hath produced ready for the Artiſt to begin his work withal. And though it be converſant before the eyes of all the World, and be a common known deſpicable matter, yet it is one of their greateſt ſecrets, which they have moſt hid and veiled, and the moſt difficult for an Artiſt to know, that this is the true ſubject that he muſt begin to work upon. But when it is truly known, men will rather wonder why they knew it no ſooner, then at their knowing of it after they do underſtand it; for the Ancients have declared the proper marks and tokens ſo fully, that

hardly can it be done more largely, except they ſhould in plain and vulgar words have named it, and ſaid this is it: which hath cauſed divers of the later Adeptiſts the more to obſcure it, and to put their Readers into the greateſt dubitation about it. This is it that they have called their metallick ſeed (and indeed is really ſo) and have given it ſo many various names and deſcriptions, according to its furtheſt, midd, or near nature, that without divine aſſiſtance, or a faithful Maſter, it is hardly to be comprehended, or known. Therefore *Sendivogius* tells us, *Semen Metallorum vel minerale creat natura in viſceribus terræ, propterea non creditur tale ſemen eſſe in rerum natura, quia inviſibile eſt.* And, *Minerale ſemen à Philoſophis cognoſcitur.* And again, *Semen Metallorum tantum filii doctrinæ noverunt.* And *Combachius* ſaith, *Metalla ſimiliter ſuum habent ſemen, ſed hoc videri non poteſt niſi a veris Philoſophis, qui illud ex ſubjecto ſuo proprio magna induſtria extrahere norunt, quanquam illud etiam facilius ratione concipi, quam corporis oculis videri poſſit.* Here if thou underſtand, I have ſaid enough; if thou doſt not, I have ſaid too much.

Nov. Lum. Chym. Tract. 6. p 318, 319.

Tract. de ſal. Philoſ. p. 7, 8.

4. The *laſt* ſort of their Mercuries that we ſhall name, is that which by the Artiſt is prepared forth of their true and proper matter, and is as *Lully* often tells us, never left prepared by nature, but muſt be made by the Artiſt. And of this, thus *Sendivogius* ſpeaketh in his practice: *Sed hoc admonitus ſis, ne accipias aurum & argentum vulgi, nam hæc ſunt mortua, accipe noſtra quæ ſunt viva, poſtea pone in ignem noſtrum, & fiet inde liquor ſiccus; primum reſolvetur terra in aquam, quæ Mercurius Philoſophorum dicitur, & illa aqua reſolvit illa corpora ſolis & lunæ, & conſumit ea*

Nov. Lum. Chym. Tract. 11. p. 332, 333.

ut non remaneat niſi pars decima, cum una parte, & hoc erit humidum radicale metallicum. From whence note:

1. That firſt they have that which he calleth their Fire, into which their *Sol* and *Luna* are put, and this their Fire is a Water; for their Water is a Fire, and calcineth the bodies of *Sol* and *Luna* more then common Fire can do; according to their maxim, *Vulgus cremat per ignem, nos per aquam*; and this is that Water which *Helmont* calleth *ignis Gehennæ*, and *ignis-aqua*, which he calls an immortal and immutable liquor, and is (notwithſtanding the opinions of all men to the contrary) the very ſame that he and *Paracelſus* call their *Alkaheſt*, and was that very Water by which *Helmont* and *Raymund Lully* fixed common Mercury, and is by *Lully* called *Aqua Cœlica*, *Aqua Lunaria*, *Menſtruum vegetabile univerſale*, and *Aquaignis*.

2. To note that their *Sol* and *Luna* are not the Gold and Silver of the Vulgar, for they ſay *aurum noſtrum non eſt aurum vulgi, neque in colore, neque in ſubſtantia.*

3. That after their earth be diſſolved in their Fire or Water, then it is called the *Mercury* of the Philoſophers, and ſo doth but at the beſt differ gradually when the earth is diſſolved in it, from the Fire or Water that did diſſolve their earth.

4. That this Water doth diſſolve thoſe bodies of *Sol* and *Luna*, and conſume them, and then it is *humidum radicale metallicum.*

5. Obſerve that in ſaying there remaineth but the tenth part with one part, he truely teacheth the proportion of the earth and water in this conjunction, if thou canſt rightly underſtand him.

Ænig. Philoſ, P. 351.

Laſtly, He tells us of this Water thus much in another place. *Et hoc vobis dico, quod opus eſt rem quærere aliquam, quæ occulta eſt, ex qua fit (miro modo) talis humiditas, quæ aurum ſine violentia ſeu ſtrepitu ſolvit; imo ita ſuaviter & naturaliter, ſicuti glacies aquæ calidæ beneficio liqueſcit, ſi hoc inveniſtis, habetis rem, ex qua aurum à natura productum eſt: Et quamvis omnia metalla, & res omnes ex illa ortum habeant, nil tamen ita amicatur ei, ſicut aurum, nam aliis rebus adhæret impuritas, auro autem nulla, propterea inſtar matris eſt ipſi:* Compare this with the former, and ſeriouſly conſider of it, for there is much hidden and couched in it.

From whence we may conſider the reaſons why they uſe this propriety in calling all theſe Mercuries theirs, or Mercuries of the Philoſophers; and thoſe chiefly we conceive to be theſe two following:

1. The moſt of theſe (or at leaſt two of them) are called theirs, becauſe Nature hath not brought them forth in that perfection that the Philoſophers deſire and ſtand in need of. But it is the Philoſophers Skill, Art, and Induſtry, that exalts them to this preheminence, which Nature had not contributed unto them, and therefore are truly and properly called theirs, for none but true Philoſophers indeed can bring them to that height of perfection.

2. The other univerſal Mercury or Hyle, hath not its vertues and excellencies known to any but to true Philoſophers, who well underſtand the nature and qualities of it. And that other Mercury which Nature produceth of it ſelf without Art, and is the principal matter, and ſeed of which Metals are generated in the bowels of the earth, they alſo call (as they do

many other things) theirs; and that becauſe though it be commonly known, and be to be had; yet none but true Philoſophers know the hidden, and ſecret vertues thereof (though it be converſant before the eyes of all the World) nor that it is the ſeed from whence Metals are produced.

But notwithſtanding all this that hath been ſaid, there are many ſo wedded to the great Opinion that they have of common Mercury, that either they believe that it is that true ſeed of Metal the Philoſophers ſpeak of; or at leaſt that forth of it the Philoſophers Mercury may be made; both of which are clear wide from the mark: For *Sendivogius* tells us plainly in theſe words, *Et quamvis corpus metallorum, ex mercurio ſit procreatum, quod de mercurio Philoſophorum intelligi debet, tamen hi non ſunt audiendi, qui putant mercurium vulgi, ſemen eſſe metallorum, & ita corpus loco ſeminis accipiunt, non conſiderantes, quod & dictus vulgi mercurius, ſuum in ſe habeat ſemen.* Therefore to put this forth of doubt, we ſhall give the differences of the Philoſophers Mercury, from common Argent vive, forth of their own mouths.

Nov. Lum. Chym. Tract. 6. p. 320, 321.

1. The Mercury of the Philoſophers is a meer product of Art forth of a fit natural ſubject, and is never to be had but by the aſſiſtance of Art. But common Quickſilver is a product of Nature without the help of Art; for there is much of it found in its own form, which the Workmen call Virgin Mercury.

2. The Chymical Fountain, or Philoſophers Mercury, doth produce all things, and vivifie all things; and on the contrary, it deſtroyeth all things, corrupteth all things, and worketh all other things that concern life and death: but ſo doth not common Mercury.

3. The Chymical Fountain is fiery and hot, but common Argent vive is cold and moiſt.

4. The Chymical Fountain with the moſt eaſie diſtillation is changed into a ſpirit, and a volatile body. But the common Argent vive is all ſpirit, and in diſtillation is not changed into a watery ſpirit, but aſcendeth corporally, no whit changed from it ſelf.

5. The ſpirit drawn from the Chymical Fountain, is fiery, and pontick, and ſo penetrating and ſubtile, that it alſo diſſolveth Metals, and being ſo diſſolved, doth deliver them to death. But common Argent vive cannot be converted into a watery, pontick ſpirit by diſtillation, nor kill or deſtroy the Metals, but only hides them in its belly, and doth vomit them up again, by ſeparating it ſelf from them, with any eaſie heat.

6. The Chymical Fountain doth diſſolve it ſelf, and congeal it ſelf, and perfect it ſelf, without any other thing added unto it. But common Quickſilver doth not diſſolve it ſelf, unleſs it be diſſolved of another; nor congeal it ſelf, nor by any means perfect it ſelf.

7. The Chymical Fountain hath in its belly and inward parts, ſalt fixed, red, and white, yea it is totally ſalt, and ſpringeth and ariſeth forth of a ſaline den. But common Argent vive is nothing elſe but a running Metal, movable, and ſlippery.

8. The Chymical Fountain hath *Sol* and *Luna* in the neareſt power, and with only ſimple coction, they are reduced into the ultimate act: which we can bring forth of common Argent vive by no kind of Artifice.

9. Of the Chymical Fountain, without any thing

added to it, is made the Elixir, and true Philoſophick Tincture: which by no means we can obtain from common Argent vive.

10. The Chymical Fountain hath in it ſelf in the neareſt power all Metals, ſeeing it is the immediate, and next ſeed, forth of which they are generated and compounded. And it is the father, efficient, and material cauſe, out of which common Quickſilver is produced, which cannot be ſaid of the other.

11. The Chymical Fountain doth compound precious ſtones in the bowels of the earth, and all thoſe others which Nature hideth in her boſom, by the congelation, and coagulation of the Fountain into ſtones, which we cannot ſay of vulgar Mercury. *Hydrogr. Spag. Pet. Fabr.l.3.c.12.*

13. Vulgar Mercury doth not ſo diſſolve Gold and Silver, that it never can again be ſeparated from them. But the Philoſophers Argent vive doth ſo diſſolve Gold and Silver, that it is never again ſeparated from them, but is as water commixt with water.

13. Vulgar Mercury hath combuſtible and evil ſulphur, with which it is made black. But the Philoſophers Argent vive hath in it ſelf ſulphur incombuſtible, fixt, good, white, and red.

14. Vulgar Mercury doth make bodies black, and ſtaineth them. But the Philoſophers Mercury doth make bodies white as Cryſtal.

15. Vulgar Mercury by præcipitation is turned into a Citrine or red powder, and an evil ſulphur. But the Philoſophers Mercury by virtue of heat, is changed into moſt white ſulphur, good fixt, and fluxible.

16. Vulgar Mercury, by how much more it is decocted, by ſo much the more it is made volatile, and

fluxible. But the Philoſophers Mercury by how much it is more decocted, by ſo much more it is thickned, and made fixt. *Sendivog. Tract. de Sulphur. & de tribus principiis.*

Theſe are the differences that theſe two Authors quoted have given of the differences of common Mercury, and that of the Philoſophers, but indeed are ſo full of equivocations and evaſions, one while meaning their Elixir, another while the catholick Mercury or Hyle, ſometimes their artificial Mercury, and but ſeldom, if at all, the matter out of which they prepare their own Mercury, or univerſal liquor. So that they may well buzzle the brains of a perſon reaſonably well verſed in their terms, and Art. But to be a little more candid, we ſhall ſhew ſome agreements betwixt the matter of which they prepare their Mercury and common Quickſilver, that the doubt of their being both one; may be put forth of all ſcruple.

1. Their matter, and vulgar Mercury agree in this, that they are both of a mineral and metallick root and principle.

2. They differ in this, the Philoſophers matter is the true root, ſeed, and principle of all other Metals, as is known by obſervation and experience; but vulgar Mercury is not the ſeed nor root of Metals, nor ever was known to grow, or change by nature into a more perfect Metal.

3. The Philoſophers matter is no one of the vulgarly known Metals, but is rather *omnia metalla*, and the true Lunary and Solary Tree; but common Mercury hath ever been taken for one of the vulgar Metals, and is no true *Electrum*, nor hath plurality in it at all.

4. The Philoſophers matter is a thing that is far more common then common Mercury, and is never ſo well apparelled, nor ſo ſpecious to the eye, as is common Quickſilver.

5. That it is threefold both in Name and Nature, and yet is but of one and the ſame root, and ſo is not common Quickſilver.

6. That it hath both fixt and volatile parts, and ſo hath not Quickſilver.

2. 2. We come now to the ſecond main point that we propoſed in this Chapter; to wit, to the conſiderations of common Quickſilver, as ſome have given it forth; and herein we muſt propoſe ſomething from *Paracelſus* that is ſingular, and (that we know of) not mentioned by any other Author; which is this.

Chir. magn. p. 152. He ſaith that Mercury containeth in it ſelf three bodies.

1. The firſt is that out of which it is generated, before it perfectly be that which it ought to be.

2. The ſecond is that which it is.

3. The third is that unto which it may be prepared by Art.

1. The firſt (he ſaith) is to be taken in its Mineral, and Ore, while it flowereth, and is to be prepared ſo as the Art of preparing Mercury doth command.

2. The ſecond requireth that the Ore be ſeparated from the Mercury by the artifice of fire.

3. The third is, that the ſame Mercury be prepared into the form of an aduſt, or burnt Metal.

Morbill. l. p. 243. In another place he tells us almoſt the ſame thing; Mercury, he ſaith, is concluded with three bodies.

1. Firſt, As it is in its Mineral, or Ore, with its bloud, and is to be as Mercury prepared by Art.

2. Secondly, the Body ſeparated from the Ore, is to be purged by fire.

3. But that the third body is that when it is reduced into an aduſt Metal.

Now for the two laſt we ſhall ſpeak of them hereafter, onely here we ſhall ſay ſomething of the firſt, which ſeemeth a ſtrange matter; for he ſeemeth to ſhew that the Ore of Quickſilver may be found and had in its Mine, when it is in its flower, and before it be hardened into that body which we call Cinnober; for in his Preparations he ſaith: Take the Ore out of which Mercury doth ariſe or grow, as it is found in its firſt coagulation, before it grow hard, or be made into a body: And calls it after it be prepared, the liquor of the immature Mineral.* Again he ſaith, Take of that Ore forth of which Mercury is generated, as it is found to conſiſt in its firſt coagulation: but yet it ought to be ſo coagulated, that it hath not yet paſſed into an hard and ſolid body. By all which it plainly appeareth that this experienced Author (than whom, no man that we read of, had ſeen more Mines, nor was more expert in Mineral knowledge) had ſeen, found, and had the Ore of Cinnober, or Quickſilver ſoft, which is a thing (doubtleſs) of that rarity, that few have had knowledge of it. And therefore I heartily deſire all the Learned that have Intereſt in foreign Parts, and all other ingenious perſons that travel, to be inquiſitive, whether any ſuch Ore of Cinnober be known, found or to be had as is ſoft, and not yet grown hard, becauſe beſides the knowledge of ſuch a mineral ſecret, there may no doubt ſome excellent Medicine be made forth of it.

Ut ſupr. p. 244.

CHAP. XXV.

Of the Deſcription of Quickſilver, of Cinnober, and its ſeveral Ores, and Paſſages, and how it is gotten, and refined in divers places, and the like.

THe deſcription of common Mercury is by moſt of the myſtical Authors omitted, that thereby they might obſcure the nature and quality of the matter from whence their Mercury is taken. For aſſerting Sulphur and Mercury to be the principles of Metals, they therefore uſually left out the deſcription of Mercury, that thereby their Readers might think that common Quickſilver was that principle of Metals which they made mention of: It being ordinary for thoſe ſort of Authors to ſet men at gaze after one thing while they intended another, and to make themſelves bread of the beſt of the Wheat, while others had but the Husks, or Bran.

Art. Aurifer. vol. 1, p. 260. For the deſcription of Argent vive *Avicen* hath a long diſcourſe of it, but may rather agree to another Mercury then to that which is common; and therefore we leave it to the Reader to conſider of according to the quotation in the Margine.

Lex Alchym. p. 67. *Rulandus* deſcribes it thus, It is no other but a viſcous water in the bowels of the earth, of a ſubtile ſubſtance of white earth, united by a total union, by a moſt temperate heat, until the humidity be tempered with the ſiccity, and the ſiccity of the humidity equally.

This deſcription any one half-eyed may ſee will not altogether agree with the nature of common Quickſilver, but ſo they uſe to mock with freſh-water Souldiers.

Muſ.Worm. l.1.Sect. 3.c 9. p.126.

The learned *Wormius* of it tells us thus; That by proper ſpeaking it cannot be ſaid to be a Metal, ſeeing the definition doth not agree unto it, for it melts not in the fire, it is not hard, ſolid, ductile, nor malleable. But it is a mineral liquor conſiſting of a viſcous metallick water, and a ſulphureous earth, full of ſpirit, volatile, cold to the touch, but indued with an hot virtue, ponderous, of the colour of ſilver, fluid as water, but not wetting the hands. And of this he reckoneth two ſorts, firſt either native or factitious, for that which is factitious we do not now meddle. And as for the Cinnober, or *Minium*, it is either mixed with ſtones, or pure. For that which is mixed with ſtones, it is ſometimes found in a ſlate-ſtone of an aſh-colour, grown together in the manner of leaves, or plates, ſometimes in a moſt white metallick ſtone, as at *Hartenſtein*. Of pure Minium, or native Cinnober (he ſaith) he had two ſorts; one rubicund, like the crude Ore of red ſilver, ponderous and elegantly tinging with a rubicund colour, found in *Haſſia* near *Marpurg*. The other is more black, of a liver-colour, alſo ponderous, being like the ſtone *Hæmatitis*, or *Schiſtus*, in which grains of Quickſilver, as though it were encloſed drops, do appear, tinging with hard affriction with a rubicund colour.

Laſt Will and Teſt. c. 9 p. 100.

Baſilius gives his relation of it thus: Mercurial Ore is wrought in its proper Mine-ſtones, by the quality of its ſalt earth, and its nimble volatile earth, in a moiſt, greaſie, ſlimy, wateriſh oleity, which is mixed with a moſt ſubtile, red ſulphureous digeſted earth, with a moſt weak ſlow binding, like an unripe pleaſing fruit, of all particular Metals. Mercury ſheweth its virtue in many things admirably, and worketh effectually upon Minerals and metalline Sulphurs, and upon ſuch which border upon Antimonial ſtones or Ores, it loveth to be in ſuch places where the Tin Ores lie higher then Silver paſſages. It requireth many iterating effectual operations unto other Ores, and is multiplied upon other ſtrange ſtones, and is drawn through the juices of Minerals and Metals which are in affinity one to another, and produce many miſcreants, this is the reaſon why it is ſo pleaſant unto Metals, Goldſmiths amalgame and gild with it. It is uſed alſo for metalline colours, and is prepared to an oyl, and water, for mans health, and is ſublimed to corrode the worſt of poyſons, and is a true robber, taketh along whatever coſts have been beſtowed on him; but if he can be catched in his nature, then is he in ſubjection and obedience unto quick and dead. He is very effectual in Medicines, eſpecially for outward ſores; he is naught to naught, and good to good; and is not every bodies friend, though he is willing to do what you put him upon. His metalline ſtones are of the ſame nature with pure white ſlate earth, inclined to a water-blue, in freſh intermingled white marbles, in a glaſſie, grayiſh or porous Glimmer, or Cat-ſilver, which lie beneath betwixt the ſlates, in a float way, which are mingled in their metalline paſſages with on-ſled marchaſites, and with the ſubtileſt ſmall ſtreaked white Talk, and are thorow grown with two ſorts, ſtanding and float-ſtriking paſſages, in which is wrought a curious red-ſhining Quickſilver Ore, not unlike unto red Mine Sulphur, and ſometimes floweth purely out of the clifts, and caves of the paſſages, ſtands in a ſink, or puddle together like water, which its natural quick ſubſtance ſufficiently evidenceth.

Paracelſus tells us theſe things of Quickſilver. For that they ſay Argent vive is a Metal, is far from the matter. For it is of the kind of other Minerals, not a Metal, not a Stone, not a Marchaſite, not a Saphir, &c. It is a peculiar product of Nature, gifted with its body, and endowed with its proprieties, as the reſt. Again he ſaith, Argent vive is Mercury, not admitting ductibility, but oppoſing it ſelf againſt it. This the *Archeus* doth caſt forth, changing it into a ſingular Metal void of ductibility. And though of all Metals it be moſt eſpecially aſſimilated to Mercury, notwithſtanding it differs in this, that it doth not obtain ductibility, by reaſon of its debility, which it conceived from Salt and Sulphur entering into it, in too little quantity. From hence it is manifeſt that by Spagyrical practice, to wit, of addition, it may be made a ductible Metal, as the Philoſophy of tranſmutation doth demonſtrate. For it may be turned and changed into every, or any Metal: Therefore, to wit, becauſe it remaineth from the operation of all Metals that may be drawn into ductibility. In another place he deſcribeth it (almoſt to the ſame purpoſe) in this manner. Moreover there is a certain kind of metallick body, that can neither be hammered, nor fluxed, or melted, and it is a mineral water of Metals. As water is amongſt other things, ſo is this amongſt Metals. But it therefore ought to be a Metal, becauſe it is reduced by Alchymy into malleation and fabrication: notwithſtanding commonly

De Miner. l. p. 346.

De Element. Aq. Trac. 3. c. 7. p. 281.

De Mineral, Tract. 1. p. 349.

monly it is not conſtant, ſometimes it is conſtant. It is to be holden that it is the firſt matter of the Alchymiſts, who of it do prepare Silver, Gold, Copper,&c. which the event ſheweth. And perhaps Tin and Lead may be made of it: for its nature is manifold, and wonderful, neither altogether to be ſought out with eaſie pains or labour. But this notwithſtanding is evident, that it is the firſt matter of the Alchymiſts, in the generating of Metals; and furthermore, is a moſt noble medicine. It groweth by ſuch a ſubtileneſs from Sulphur, Mercury, and Salt, that it floweth, or is liquid, and yet doth not moiſten; it runneth and yet hath no feet, and is the moſt heavy of all Metals.

From theſe dark ſayings of this myſtical Author, we may gather theſe things.

1. That in propriety of Language it is not a Metal, as abiding neither fuſion nor malleation; and that it is a Metal, or may be made one by the Art of Alchymiſtry, but not without addition of ſomething, which doubtleſs is their Tincture, or Elixir. And then it may be turned into any other Metal, according as the Elixir was fermented, and ſo in that reſpect is by them truly called Mercury: and yet that of its own kind it is a mineral water, and of a metallick nature.

2. That it is of a ſtrange and wonderful nature not eaſily by labour found out: which made *Helmont* confeſs that he had ſpent thirty years *ſub ferula Mercurii*, and that it had not its compeer in Nature.

3. That when he ſaith that it is the firſt matter of the Alchymiſts in generating of Metals, he ſpeaketh the poſitive truth, yet muſt he not be underſtood to mean that it is the firſt matter that Nature uſeth to frame or generate Metals of in the bowels of the earth,

for that firſt matter it is not, neither the firſt matter (as too many vainly dream) whereof they make their Elixir: But it is the firſt and principal matter by which with their Elixir they change, or generate Metals by the rules of Art. For *Helmont* tells us, and that truly; *Eo quod Æternus, non creaverit humiditatem, conſtantia ſui, Mercurio metallico aſſimilandum.* And again he tells us, *Si Mercurius eſſet diviſibilis in partes Heterogeneas, ars Chymica non eſſet vera: ac ipſe Mercurius ineptus operi eſſet. Etenim niſi mercurium vidiſſem, ita ſubſiſtentem, negarem artem eſſe veram.*

Progymn. Met. 70.

Tria prim. Chym. p. 408.

4. Where he ſaith that Quickſilver is the moſt heavy of all Metals, it muſt be underſtood with a grain of Salt.

Rulandus and *Eucelius* tell us of two ſorts of Native Quickſilver.

Lex. Alchym. p. 69.

1. That which is of its own colour without excoction, which is found ſuch among Metals, in the cavities into which it hath flowed forth of the Ore.

2. That which is had forth of the Ore by waſhing or excoction, and this Ore is that which was called *Nativum Minium*, or *Cinnabaris Metallica*, and the *Germans* call it **Berg Zinober**: and was found in their Mines; of which he noteth theſe ſorts:

1. A Vein of Cinnober in which the Argent vive did grow, that as often as it was broken the Argent vive diſtilled forth drop by drop.

2. Like to crude red ſilver Ore, that was brought from the Valley of *Joachim*.

3. Like to Scarlet in a fire-ſtone of Gold.

4. Like to the ſame in an aſh coloured ſlate, or cleaving-ſtone.

5. A Vein rich of Quickſilver, of a Liver-colour.

6. Like unto crude red, tranſparent ſilver Ore, in Cat-ſilver, of the colour of ſilver.

7. From *Hydria* black with a reddiſhneſs, which ſmitten with the hammer, did drop forth little grains of Argent vive.

8. At the ſame place of a light red colour.

9. Of a yellow colour, in which was mingled in channels a fire-ſtone of a golden colour.

Agricol. Berm. p.698.
Anat Spagyr. Mercur.l.1.c.5. p.415,416, 417,418.

Much-what agreeable to theſe doth *Agricola* mention, to whom I remit the Reader. *Mathias Vutzerus* tells us of divers places where Argent vive is found in its own form and colour without excoction. And one ſort, eſpecially in the Mountain *Gimnanede*, ſix miles from *Cracovia* in *Poland*; which of its own accord at certain times of the year doth break forth to the ſuperficies of the Earth, but eſpecially about Autumn, although alſo about the Feaſt of St. *John Baptiſt*, the Author of the *Tyrocinium Chymicum* doth teſtifie, that he had gathered many grains like Peaſe, in the roots of the Graſs, and ſaith that notwithſtanding that Mercury was too wateriſh, and inferiour far in goodneſs and vertue to that of *Spain* and *Slavonia*. And of Native *Cinnober* or *Minium* he reckoneth the ſame ſorts, and colours, and nameth the places where they are gotten, and ſaith that Native Cinnober, and the *Lapis Schiſtus*, are as it were the Parents of Argent vive; to which, to eſchew repetition, I refer the inquiſitive Reader.

Tyr. Chym. l.2.c 13.p.305.

Philoſ.Tranſ. n.2. p.21,22, 23, &c.

There is a notable, ingenious, and ſuccinct Extract of a Letter, written from *Venice*, by the learned Doctor *Walter Pope*, to the reverend Dean of *Rippon*, Doctor *John Wilkins*, concerning the Mines of Mercury

cury in *Friuli*. Where he exactly relateth that about a days Journey and an half diſtant from *Goritia* Northwards, at a place called *Idria*, ſituated in a Valley of the *Julian Alps*. There he deſcribeth the nature of the ſoyl, and the depth, and quantity of their Mines, and their manner of Working, waſhing, and the like. The Ore he deſcribeth thus. They (he ſaith) dig the Mineral with Pick-axes following the Veins: 'tis for the moſt part hard as a ſtone, but more weighty, of a liver-colour, or that of *Crocus Metallorum*. There is alſo ſome ſoft earth, in which you may plainly ſee the Mercury in little particles. There are alſo ſeveral Marchaſites, and Stones, which ſeem to have ſpecks of Gold in them; but upon trial they ſay they find none in them. Theſe round Stones are ſome of them very ponderous, and well impregnated with Mercury, others light, having little or none in them. And ſo he deſcribeth the manner of getting the Mercury forth of the Ore or Stones; which for brevity I omit, and leave the Reader to the more full relation of the Extract it ſelf. Onely he relateth that they have their Mercury two ways, the one is by the means of the fire; the other he relateth thus. All the Mercury got without the uſe of fire, whether by waſhing, or found in the Mines (for in the digging ſome little particles get together, ſo that in ſome places you might take up two or three ſpoonfuls of pure Mercury) is called by them Virgin Mercury, and eſteemed above the reſt. I enquired (he ſaith) of the Officer, what virtue that had more then the other; he told me, that making an Amalgama of Gold and Virgin-mercury, and putting it to the fire, that Mercury would carry away all the Gold with it, which common Mercury would not do.

De difficult. Alchym. l. in Theatr. Chym. Vol.1.p.144.

Theeb. de Hoghbeland of *Middleburgh*, tells us a Story not unlike this recited; that travelling to view, and examine Mines with their ſeveral Ores, he came to the Mountain *Idria*, where by good fortune at that time, Argent vive, which of its own accord had flowed forth of the Mine, was gathered forth of the River hard by, of which by gift he received fifteen pounds weight. And then purpoſing to travel to *Schonbach*, a little Town of *Miſnia* or *Voitland*, by reaſon of a famous Mine there, of native and rubicund Cinnober; he turned to *Norenburg*, and there he obtained a piece of native Cinnober from the ſame Mine, almoſt of two pound weight; he went no further, but turned to *Cruitznach*, a Town of the *Palatinate*; and from thence, and divers other places, he got good ſtore of Argent-vive, or of native Cinnober, and ſo ceaſed.

The Hiſtory of the *Indies*, c. 11, 12. p.237, 238, 239, 240, 241, &c.

Alſo *Joſephus Acoſta* tells us: That at the *Indies* Quickſilver is found in a kind of ſtone, which doth likewiſe yield Vermilion, which the Ancients called *Minium*, and at this day they call the Images of Cryſtal Miniades, which are painted with Quickſilver. After he ſaith, It is a rock of moſt hard ſtone, interlaced all with Quickſilver, and of that greatneſs, that it extends above fourſcore Vares or Yards in length, and forty in breadth, in which Mine they have many Pits and Ditches, &c.

For native Cinnober I have by me three ſorts, that with much difficulty I have procured, it is ſo ſcarce to be gotten here in *England*.

1. One of them is a ponderous Ore, of a dark red colour, but indifferently rich of Quickſilver.

2. Another is pretty reddiſh in ſome parts, but

ſomething whitiſh in the other parts, but very full of the Argent-vive, that appeareth in very ſmall grains.

3. The third ſort is in ſmall pieces, the greateſt not much bigger then beans, of a very rubicund colour, and ſhining, which being broken, do ſhew very ſmall grains, like the points of Pins, of the Argent vive; and this I procured forth of *Germany*, and they call it **Berg Zinober**, or *Cinnabaris Montana*. Alſo I have had intelligence from ſome learned *Germans*, that there is ſome of this ſort that is tranſparent, but is but rarely found, and therefore hardly to be had. Of which *Quercetan* gives us this account. *Quod ad nativum & naturale Cinabrium attinet; natura nobis in quibuſdam Aurifodinis in Hungaria, profert genus quoddam Mineralis Cinnabaris ponderoſiſſimæ, ac longe artificiali rubicundioris: Imo etiam quæ uſque adeo tranſparens, ac dilucida eſt, ut non minoris pretii, ac majoris etiam ipſo auro æſtimetur.* And commends it highly in vertiginous and epileptical diſtempers, even taken by it ſelf, without any preceding preparation.

Pharmacop. c. 10. Not. 13. p. 672.

Now for either Argent-vive, or the ſtone it groweth in, called Native Cinnober, (though *Agricola* ſeem to intimate as much) I could never hear of any that was found either in *England*, or *Scotland*, onely Dr. *Jorden* gives us this account. In *Scotland* three miles beyond *Berwick* (he ſaith) I found a red ſtone, which I take to be *Minium nativum*, ſeeing *Agricola* makes mention of it in *Scotland*, but by a miſchance I could not try it. From which hint I could deſire all ingenious perſons that live near that place, to make diligent ſearch, if any ſuch ſtones be there to be found, that thereof trial might be made.

CHAP.

CHAP. XXVI.

Of ſeveral ſorts of Medicaments prepared forth of common Mercury, both by the way of vulgar Chymiſtry, as alſo by the myſtical way. And of the Præcipiolum *of* Paracelſus *and* Helmont.

THere are ſo many ſeveral Medicaments prepared by common Chymiſtry forth of Quickſilver, that it would be very tedious, and too large to recite them all; as is eaſie to be ſeen in *Crollius*, *Beguinus*, *Hartman*, *Schroderus*, *Quercetan*, *Vutzerus*, and the like; and therefore we ſhall onely enumerate ſome few of the principal of them.

1. And firſt there is that which they call *Mercurius vitæ*, which whether it participate ſolely of the Antimony, or ſolely of the Mercury, is not ſo eaſie to determine, there being Authors, that hold it ſtiffly on either ſide; and we never accounted the Experiment either ſo luciferous, or frugiferous, to make it our buſineſs to attend trials, and exact obſervations about it. As for the *Mercurius vitæ* we have adminiſtred it very frequently for the ſpace of near thirty years, and can give it no further commendations, then that it is a ſtrong and churliſh Vomit, fit only for robuſt bodies, and beneficial onely in ſome Phlegmatick diſtempers, and far unworthy of thoſe high praiſes that are uſually attributed unto it, and therefore now we do very rarely, or never uſe it, having found other

mineral Vomits, that are far more ſafe, and of more effectual operation then it; and I wiſh all Tyroniſts to take care of its preparation.

2. The next we ſhall name is their *Turpethum Minerale*, which is indeed a mercurial one, and that ſharp and deſperate enough, if not very carefully and skilfully handled. In our younger years when we had too high an eſteem of Chymical Medicines, we have often uſed, and adminiſtred the ſame, and that with no bad ſucceſs, eſpecially in ſome ſorts of Epileptical diſtempers: But ſhall warn all young Phyſicians to be both careful in their preparing of it, and in their adminiſtration of it alſo, eſpecially in that great point *de ratione victus*. And all I can commend it for (if that may be called a commendation) is for that woful and diſhonourable way of curing by flux or ſalivation, which indeed is a way of cure, almoſt as bad as the worſt of diſeaſes.

3. The next we ſhall name, is that preparation of it which they call *Mercurius dulcis*; which is of very frequent uſe, and exceedingly extolled by many; we confeſs it may have a commendable uſe in Chirurgery, and may to ſundry good purpoſes be mixed with Plaſters and Unguents; and is of ſingular effect in Ointments againſt all Verminous diſtempers, and taken inwardly doth the ſame; and is a pretty purger, or promoteth the working of other Catharticks; but heed muſt be taken, that it be not adminiſtred too often near together, for fear of a ſore mouth, looſneſs of teeth, or a flux. And yet for the Worms may the crude Quickſilver it ſelf, or the water wherein it is boyled, be taken with as much or more ſafety, and as good effects.

4. The laſt we ſhall name, is ſome ſorts of Præcipitates prepared forth of Mercury; not to mention the common Præcipitate prepared after *Vigo*'s order, or the white one, which (if uſed inwardly) are far more likely to kill then to cure. One of the beſt, is the Quickſilver præcipitated *per ſe*; which notwithſtanding is a violent Vomitive Medicine, yet may be tolerably uſed by a skilful and careful Phyſician. But the beſt that ever we have ſeen, is a Præcipitate prepared with the good and pure ſpirit of Nitre, and afterwards often cohobated with the diſtilled water of the whites of Eggs, whereby it will become of a fine red colour as any red coral, and almoſt as ſweet as honey; and hardly to be diſtinguiſhed from the true *Arcanum corallinum* that is prepared with the great liquor *Alkaheſt*; and though it be vomitive in ſome meaſure, and be far ſhort of the eminent vertues of the other *Arcanum*, yet will it never diſgrace a skilful Artiſt, that knows its due preparation and way of adminiſtring; but will without vomit or purging (if rightly handled) even cure deſperate Agues by ſweating onely.

But I will conclude of all theſe with that of *Helmont*, who ſaith, *Antimonium dum vomitum movet, & Mercurius dum vivificari poteſt; non ſunt boni viri remedia.*

We deſcend now to treat of thoſe great *Arcana's* that are no ways to be obtained but by that univerſal ſolvent, the *Alkaheſt*, that noble liquor, that is the ſole glory of a Philoſopher in this frail life. Which is that Key that onely opens the Roſary of the Philoſophers, and revealeth the hidden ſecrets of the Animal, Vegetable, and Mineral kingdom, without the knowledge, and poſſeſſion of which no man is worthy to ſit at the golden Table of the Adeptiſts, nor indeed truly worthy the name of Phyſician.

Nec prius ante datur telluris operta ſubire
Auricomos quàm quis diſcerpſerit arbore fœtus.

Of theſe Arcana's prepared by this liquor forth of this Mineral of Mercury, *Helmont* firſt mentioneth the *Mercurius Diaphoretius*, of which he ſaith thus, *Quarto loco eſt Mercurius Diaphoreticus, melle dulcior, & ad ignem fixus, ſolis horizontis omnes proprietates habet. Perficit enim quicquid Medicus & Chirurgus poſſint optare ſanando: non tamen tam potenter renovat, ut præcedentia.* In his anſwers to the queſtions propounded unto him concerning this, he maketh this reſponſion, to wit; That as the Sun is thought to ſpring up in the Horizon of the Hemiſphere: ſo Mercury, while it is made Diaphoretick, ſweet as Honey, and fixt as Gold, is Gold in its Horizon, and is in medicine, by ſo much more noble than Gold, as much as an Oriental Pearl is nobler than a Scotch one. And after he telleth us, that the glorious Sulphur of Venus being raiſed again doth tinge the Sulphur of the Mercury (that in the Powder of *John de Vigo*, by ſulphureous corroſive Minerals was extroverted) immediately, and did mutually imbrace one another in an inſeparable bed: And that therefore the vertue of both the Sulphurs did ſtand outwardly. And therefore by this conjunction the Diaphoretick Mercury from thence ariſing, did perform whatſoever the Phyſician or Chirurgeon could wiſh, either in reſpect of curing acute or chronical diſeaſes.

1.

Arcan. Paracel. p. 790.

De Lithiaſ. l. c. 8. p. 69.

De Febrib. l. c. 14. p. 52.

Again, in another place, he largely deſcribeth the vertues and effects of this *Mercurius Diaphoreticus*, in relation both to Internal, and External Diſtempers. And of its Preparation tells us thus much; Its deſcription (he ſaith) is as well in *Paracelſus* Book *De Morte Rerum*, as in his *Chirurgia Magna*, and ſaith, he will declare it ſomething more manifeſtly. Take the Powder of *John de Vigo*, prepared with thine own hand: For otherwiſe it is adulterated with artificial *Minium* or red Lead; as the moſt Chymical medicaments that are to be ſold, are full of deceit. This Powder, the element of fire extracted from the Vitriol of Venus being affuſed, or poured upon it, is five times to be cohobated with *Aqua Regis*, at the end increaſing the fire; for it is fully fixed, and is a Powder very corroſive. Which then is to be cohobated ten times, with *Aqua vitæ* dephlegmed the beſt that may be, and renewed at every time, until it have carried off all the corroſiveneſs with it. And then this Powder is ſweet as Sugar. Therefore the Spirit of Wine is there called *Saltaberi*, or *Tabarzet*, which ſoundeth Sugar, not that it is ſweet in it ſelf, but that it carrieth away the corroſive ſpirits with it. So far, that the remaining Powder doth excel in its own ſweetneſs, not with a ſweetneſs borrowed elſewhere. For beſides, that the fire of Vitriol is ſweet, the very Sulphur of the Mercury, then turned outwardly, is of greateſt ſweetneſs. This Powder is fixed, and is called Horizontal Gold. Therefore (he ſaith) I have finiſhed a ſecret in few words, which doth ennoble a Phyſician. But to have prepared it the firſt time, is of huge labour, and its direction dependeth of his hand, to whom all honour is due, becauſe he revealeth theſe ſecrets to little ones, which the world knoweth not of, and therefore diſeſteemeth. From all this we ſhall animadvert ſome few things to be conſidered of, by the learned and ingenious.

1. To conſider the high excellency of this medicine, that is ſo noble, that in operation it effecteth whatſoever a Phyſician or Chirurgeon can deſire: And therefore may well inſtigate all of thoſe Profeſſions, that they may bend all their ſtudies and endeavours both day and night to the obtaining of the ſame.

2. That it is no wonder that they call it Horizontal Gold, which if one ſeriouſly conſider the great medical vertues, is an appoſite name, and to be eſteemed far more precious than common Gold, that cannot afford ſuch rare and almoſt incredible effects.

3. To remember that it cannot be perfected without the Sulphur or fire of Venus, which though he call the Sulphur or fire of Vitriol, yet it is not the Spirit of Vitriol, however rectified; but is the Sulphur of Copper it ſelf, which cannot be had, but by the total deſtruction of its body, and the leaving of its internal and incombuſtible Sulphur, inſeparable from its remaining white, anonymous metallick mercurial body; and this to be performed by no ſublunary body but only by the Alkaheſt.

4. To note that the fire of Venus muſt be poured upon the Powder of *John de Vigo*, prepared by ones own hand, whereby it appeareth that it muſt be in a liquid form, otherwiſe it might be mixed with it, but not poured upon it, and therefore certainly is in the

form of a green Oil, as both he and *Paracelſus* do make manifeſt. But one chief point is here tacitely concealed, that is the quantities of either of them, which the ſtudious Reader muſt labour to find out.

5. It may be ſome that are very critical, may queſtion what ſort of *Aqua Regis* this Author meaneth, but it is plain that it is the common ſort, and no myſtical kind, becauſe he telleth us plainly that after five times cohobation with it, and increaſing of the fire, it remaineth an exceeding corroſive Powder; and therefore muſt be cohobated ten times with the beſt dephlegmed *Aqua vitæ*, every time being renewed, or freſh uſed, and that thereby the corroſive ſpirits are all carried off with the Spirit of Wine, and the Powder left as ſweet as Sugar. And if we conſider what this Author hath told us elſewhere, then we are to know, that it is no rectified Spirit of Wine by any common way, but prepared by the Alkaheſt, which is required twice in this Preparation, once for the fire of Venus, and alſo for the Spirit of Wine.

6. As for the places in *Paracelſus* in his Book *De Morte Rerum*, and in his *Chirurgia Magna*, though that Author ſeem dark enough, yet to an attentive and underſtanding Reader he hath ſhewed things that are ſufficient to underſtand its Preparation by, and hath omitted nothing in the forecited places, but only the naming of the Alkaheſt, which in all his great Preparations he commonly leaveth out: Though in other parts of his Writings he hath ſpoken more fully, (both as to the matter forth of which, and the manner how, that great liquor is to be had, and prepared) than any other Author that I know of, and thoſe that cannot learn it from his Writings,

will hardly underſtand it in other Authors.

2. The next great Arcanum to be had forth of common Mercury, is that which he calleth *Arcanum Corallinum*, or *Corallatum*, of which he ſaith this. And there is the purgation *Diuceltataſſon*, which cures the Gout no leſs than Fevers. And its Arcanum is De Febr. l. c. 14. p. 52. called *Corallinum*, which is prepared out of the eſſence of Horizontal gold, after this manner: Draw off the liquor Alkaheſt from vulgar vendible Mercury, which *Paracelſus* remembreth 2. *de viribus membrorum, c. de hepate*, which is done in one quarter of an hour. For *Raymundus* ſaith, my friends being by, and the King preſent, I have coagulated Argent-vive; and none except the King knew the way or manner. In which coagulation, this is moſt ſingular, that the ſaid liquor Alkaheſt doth prevail the ſame in number, weight, and activity, ſo much the thouſand action, as much as in the firſt; becauſe it acteth without the re-action of the patient. Therefore the Mercury being ſo coagulated, without any remnant of the thing coagulating, then make ſmall powder of it: and diſtil from it five times, the water of the whites of eggs diſtilled, and the Sulphur of the Mercury, that by its former coagulation was drawn outwardly, will be made rubicund as Coral: and although the water of the whites of eggs doth ſtink, notwithſtanding this powder is ſweet, fixed, bearing all the fire of the bellows. Neither doth it periſh in the examination of Lead, notwithſtanding it is ſpoiled of its medical virtue while it is reduced into a white metal: but it is given to eight grains for the moſt part, becauſe it purgeth the body of man as long as it is foul, and not perfectly ſound. Alſo it healeth Ulcers of the blad-

der,

Arcan. Par. p. 790.

der, of the Larinx, and Oeſophagus. And in another place he reciteth it almoſt in the ſame manner, but not ſo fully. In another place he ſaith of it thus. Therefore the purgation by the Arcanum Corallinum, doth deſtroy the Gout in its ſeed. But this Arcanum is not the colour or tincture of Coral, (as the ignorant company of Chymical Writers, to be laught at, do interpret) becauſe the appoſite words of *Paracelſus* (which is of the eſſence of Gold) do ſound another thing.

Vol. Vivent. &c. p. 387.

Alſo the colour of Gold, the Sulphur, or Tincture, do not looſe the belly, or purge: but this Arcanum is in ſubſtance, metallick; in colour, coralline; in taſte, like honey; and in eſſence, golden. Truly not that ever it was a malleable body, but is the Horizon of Gold, a ſhut-up body, and fixed; whoſe Sulphur is ſweet, and to be commixed with our Conſtitutive parts. In this Sulphur the Omnipotent hath collected all the virtues of the Sun, to whom only all honour and glory is due.

We have before, where we ſpoke of the Alkaheſt, ſaid much to what from all this might be obſerved: only we ſhall add theſe few things.

1. That the Learned may note, that the Writings of *Paracelſus* (by many ſo much condemned) do bear in them a far deeper ſenſe and meaning than even common Chymiſts do imagine; and are not to be weighed according to the letter, but according to the depth of that Learning the Author was maſter of. And therefore we may here obſerve that *Helmont* underſtood him otherwiſe (and that according to the truth of his meaning) than many hundreds have done beſides.

2. That he that will underſtand the matter out of which the Alkaheſt is prepared, and its manner of preparation alſo, can never find either of them by any ſurer way than by truly conſidering and underſtanding the effects of that liquor. And I am bold to tell all ſearchers, that no effect of it doth more declare the matter from whence it is taken, than this that he hath related in what I have before quoted; and therefore let it be obſerved.

3. Where he ſaith, That the Mercury being coagulated by the liquor Alkaheſt, hath its Sulphur extroverted: but if it be melted down into a white metal, that then it loſeth its medical virtue. The reaſon of which is, (though we may be condemned for diſcloſing it) that the medicinal virtue conſiſts only in the external and ſeparable Sulphur, and not in the Mercurial part, which is not to be deſtroyed either by Art or Nature; and therefore in fluxing it down into a white metal, the external Sulphur is waſted in the fire, or burnt off, and ſo the medical virtue muſt needs be loſt, which conſiſted only in the Sulphur.

The laſt thing that we purpoſed to handle here, is the Præcipiolum of *Paracelſus*, for from him *Helmont* had it; and therefore might well confeſs (though in many things he is very injurious unto him, even ſometimes to attribute thoſe Theorical notions to himſelf, that he plainly ſtole from him, and yet laboured to deprive him of the honour) that by his Writings he had profited much. But ere we give our cenſure about this Præcipiolum, we ſhall fully give the Reader an account what they both ſay in the matter. And firſt, *Paracelſus* thus: The condition of Mercury is, that it be precipitated in its Mineral or Ore, and be

De Hydropiſ. l. p. 623. ſeparated from it dead; for ſo it is not Argent-vive, but Mercury: for when dead, it is Mercury; but living, it is Argent-vive. If therefore, as the preſcribed manner of its preparation, it be mortified; its doſe is two grains, the proceſs being obſerved, that the Schole delivereth, neither need it be included in the Text.

Ignot. Hydrop. p. 521. The relation of *Helmont* is thus. But *Paracelſus* approveth his Præcipiolum or Mercury, drawn forth dead out of its Mineral or Ore, above other remedies: but other ſimples, for the degree of affinity, by which they come near this metallick Mercury. And a little after he ſaith, In the mean time I confeſs, that that ſame Mercury hath always anſwered to my deſires. Truly its acquiſition is difficult, but the doſe of two grains three or four times exhibited doth ſuffice. But the Diaphoretick Mercury once being had, it ſufficeth to many myriads of diſeaſed perſons, as well for the Phyſician as for his poſterity.

That which we ſhall move from hence is this, That there are ſome learned men with whom we have converſed, or had intercourſe by Letters, that are of opinion that this Præcipiolum, or dead Mercury, is ſome artificial preparation by the Alkaheſt: but ſaving the judgments of thoſe men, we cannot be of their opinion, for theſe reaſons.

1. Becauſe both the Authors ſay that it is drawn dead forth of its Mineral or Ore, and therefore in likelihood muſt be by nature mortified in its Ore, or elſe it could not be ſo drawn forth of it, except it were dead before.

2. *Helmont* ſaith it is of difficult acquiſition, not of difficult preparation, ſo that only the difficulty muſt

be in finding or obtaining ſuch of its Ore as hath the Argent-vive mortified in it when it is digged forth of the earth, and not made ſo by Art.

3. He compareth the Diaphoretick Mercury with it, and extols it far above it, as able to ſerve the Phyſician and his poſterity, being once but had, but doth not ſay ſo much of the Præcipiolum.

Therefore I would intreat all ingenious and learned perſons to take notice of theſe two things.

1. That *Paracelſus* tells us, that while Argent-vive is living, it is Argent-vive, but Mercury when it is dead, or ſo fixed that it cannot be revived again; for then it is like the Planet *Mercury*, able to exert its virtues, when before it is (though a tremulous body, and ſeeming open) moſt of all ſhut, and doth utterly deny its help to humane bodies. So that *Longè alius eſt ſenſus Sophorum, quam vulgarium literatorum.*

2. To move all inquiſitive perſons that either travel where Mines of Quickſilver are, or have correſpondency with any that live near them, or work in them, to endeavour if any ſuch thing may be found as the Ore that hath the Argent-vive dead in it.

Chap. XXVII.

Of Antimony or Stibium. Of Wiſmuth, Biſmuth, or Plumbum Cinereum, or Tinglaſs. Of Zinetum, Zinck or Spelter. Of Cobaltum. And of their Qualities, Ores and Medicaments, prepared forth of ſome of them, and of native Electrum.

HAving now ended our Collections and Diſcourſe of the ſeven Metals, vulgarly accounted ſo; we now come to ſome others, that many do alſo repute for Metals; and if they be not ſo, at leaſt they are ſemi-Metals; and ſome of them accounted new Metals or Minerals, of that ſort that were not known to the Ancients; of which we ſhall ſpeak in order.

Muſ. Worm. l. 1. Sect. 3. c. 8. p. 125. Of ſome of theſe *Wormius* ſaith, We call thoſe of their own kind *ſui generis*, and improperly Metals, which have great affinity with thoſe that are true Metal, if thou mark the riſe, manner and place of Generation: But they differ in certain proprieties that are agreeable to true Metals, for they are not ductile or malleable, but brittle or frangible.

1. Ubi ſupra. Antimony or Stibium, which the Germans call **Spieſsglaſs**, ſeems to be a Metal of its own kind, although *Paracelſus* put it in the number of Marchaſites, *lib. 6. Archidox.* where he calleth it the *Marchaſite* of Lead, doth conſiſt of a combuſtible mineral ſubſtance, and of a fuliginous Mercury, coagulated of a certain earthly matter. Its Ore is found in the

mountains as other Metals, and from thence is drawn by various operations. It is found in *Italy*, and the beſt in *Hungary*, in *Germany* at *Hoenſtein*, and in *Bohemia.* In times paſt it was ſold as it was digged forth of the earth: that which was moſt approved of by *Dioſcorides*, was that which moſt ſhined with rays; and when it was broken, would be divided into ſhells or cruſts, being friable, or to be crumbled, void of earth and filth, which *Pliny* called the female. Now it is ſold by Merchants in loaves, or meaſures, as if melted: outwardly it is cruſty, and of a leaden colour, for the moſt part infecting the fingers; within, full of capillary veins, gliſtering and ſhining as poliſhed Iron; in burſting and breaking, eaſie: but when it is made into powder, it loſeth its ſplendor, and aſſumeth the colour of burnt Lead. And a little after he ſaith, The Hungarian Ore of Antimony is moſt beautiful, wholly conſiſting of Cylinders, or ſmall Columns, of the thickneſs of a ſmall Needle, but wonderfully knit together, for they are to be ſeen right, parallel, oblique, tranſverſe, *&c.* becauſe this matter is porous, and appeareth with a ſplendid blue colour, like poliſhed Iron. From hence a ſulphureous and yellow matter doth ſweat forth, rendring the maſs divers coloured, the gift of Doctor *Cuſterus*.

The like to thoſe in a manner doth *Agricola* write of Antimony, and ſaith, That it is ſomething like in colour to the *Lapis Plumbarius*, or Lead Ore, but that it ſhineth more, and is more white. *Rulandus* tells us, that the Ore of it was found in their mines of *Germany*, and doth reckon up theſe ſorts.

De nat. Foſſil. l. 10. p. 657.

1. That it was digged up at *Rome* in the Flaminian Circuit, and was ſoft, and black, and cruſty, or ſhelly, like Cat-ſilver.

Lex. Alchym. p. 447.

2. Digged up that was friable, or would crumble, like to poliſhed Iron, from the Iſland *Ilna* in the *Tyrrhene* Sea.

3. Digged up in *Bohemia*, in a white Flint-ſtone.

4. At *Isfeld* in *Hercynia*, which is as it were conglutinated together with little, long, and round-angled little cruſts, in a white Flint.

5. At *Stolberg*, in which there are white ſix-angled fluores, that are pellucid.

6. In *Pannonia*, in which there is Gold, and Black Lead.

7. A Vein of Stibium like to barren Galena.

8. In an hard Stone,like a Fire-ſtone or Marchaſite, of the colour of Silver.

9. A Vein of Iron, in which is found Stibium.

10. Growing near the Stone Schiſton beſides *Friburg* in *Miſnia*. *Cambden* tells us, neither only Lead, but Stibium alſo,called in the Apothecaries ſhops Antimony,is here found by it ſelf in Veins. And Doctor *Merrett* ſaith, that Antimony is found in the Lead Mines of *Darbyſhire*; and I am informed by divers that have long wrought in *Darbyſhire*, that there is good ſtore of it, eſpecially in ſome places, but I have not been able as yet to procure any of it. That Ore of Antimony that I had forth of *Germany*, is of a bright blewiſh colour, and lieth in a yellowiſh, grayiſh ſtone, and is moſt like to that ſort of Lead-Ore which they call Steel-Ore. I could earneſtly deſire all our Engliſh Miners to be vigilant and careful to diſcover where any of the Ore may be gotten, for it is a good vendible Commodity, and much gain and profit might be made of it. *Baſilius* of it ſaith thus: Antimony comes from perfect Mercury,

Darbyſhire, p. 556.

Pin. re. nat. p. 209.

wrought of little Salt, and a wateriſh fluid Sulphur, though it ſhineth black naturally, and its outſide is of an Antimonial form, yet it graduateth the noble nature of Gold, and doth much good unto man. But thoſe that would be more fully ſatisfied of the excellent properties of Antimony, may ſeriouſly weigh the *Currus Antimonii triumphalis* of *Baſilius*, and the Writings of *Paracelſus*, who not only have written largely of its virtues, but alſo underſtood the intrinſecal nature of it, better than any other two that can be named. And for the Medicines that may be, or are prepared forth of it by common Chymiſtry, which are very numerous, the Reader may find them in *Sala*, *Hammerus*, *Poppius*, *Schroderus*, and almoſt in every Diſpenſatory: ſo that we need not inlarge here to recite them, for there is ſcarcely any one Mineral that is more largely treated of than Antimony; only we ſhall ſpeak a little of thoſe great Arcana's that *Paracelſus* and *Helmont* prepared forth of it by the Alkaheſt.

Laſt will and Teſt. c.10. p. 102.

1. The firſt Medicine that *Helmont* nameth, prepared forth of Antimony, is the *Mercurius vitæ*, of which he ſaith thus; *Sequitur dein Mercurius vitæ, ſtibii proles integri, quæ omnem morbi nervum penitùs abſorbet.* Which though he call *Mercurius vitæ*, as having Mercury joined with it in its Preparation, yet is the off-ſpring of the whole *Stibium*, and none of the Mercury joined with it. And doubtleſs is not the *Mercurius vitæ* prepared by common Chymiſtry, that doth both violently purge and vomit, but is of a far more noble nature and virtue, as being prepared by the Alkaheſt, and therefore doth not only cure diſeaſes, but in ſome meaſure, renew Nature alſo. The

manner of its Preparation he no where (that I can Lib. 5. p. 20. obſerve) doth mention, but *Paracelſus* according to Lib. de Vit. Long. c. 6. p. 64. his dark faſhion doth ſet it down in his *Archidoxis*, as alſo in his Book *De Vita Longa*, and in both places tacitly concealeth the Alkaheſt.

2. The ſecond is the Sulphur or fire of Antimony, of which *Helmont* made ſo great account, and que- Arc. Parac. p. 790. ſtionleſs is the *Tinctura Lili Antimonialis*, for *Helmont* ſaith, *Tertio loco eſt Tinctura Lili, etiam Antimonialis*, almoſt of the ſame virtue with the former, although of leſs efficacy. And the reaſon why we ſo boldly affirm theſe to be prepared by the Alkaheſt is Reſp. Auth. p. 524. the authority of the ſaid *Helmont*, who ſaith, *Probabo primò, quod liquor Alkaheſt, ens primum ſalium, Lili, primus metallus, Mercurius Diaphoreticus. ſive aurum Horizontale, unum inquam, qualecunq; ex illis (nam cuncta unius diſſolventis conſanguinitate, conſpirant in uniſonum) ſat ſit ad quorumlibet morborum ſanationem, utut momis crepent ilia. Imprimis norunt Adepti mecum, quantum hinc diſtent diſpenſatoria Seplaſiæ, imò & quam remoti abſint ſcriptores, qui* Chir. Mag. tr. 3. c. 5. p. 67. *Baſilica, & Tyrocinia Chymica ingenti gloriolæ pruritu, adhuc ipſimet Tyrones ediderunt.* But the Preparation of the *Tinctura Lili*, that is Antimonial, you may find in the Writings of *Paracelſus*.

2. *Plumbum Cinereum* was known to the Ancients, but little ſaid of its uſe, or vertues, and by this name Muſ. Worm. l. 1. Sect. 3. c. 8. p. 125. *Agricola* calls it, the Miners call it *Biſmutum*, *Cæſalpinus* a Silver Marchaſite, the *Germans* **Biſmut**, **Mythin**, and **Conterfeit**. It is rather, I think (ſaith *Wormius*) a Metal of its own kind, than to be referred unto Lead. For it differeth from both Tin and common Lead in colour, and hardneſs. It ſometimes

ſhines

ſhineth with a ſilver colour, and ſometimes with a dilute purple, like to *Stibium* or Antimony, according to its figure, but more excellent in colour, being like the *Regulus Stellatus* of Antimony. The Ore from whence it is drawn is like to *Galena*, but it infecteth or coloureth the hands, which the *Galena* doth not. And it is found ſolid, which admitteth cutting, and doth not break, or leap aſunder as the *Galena*. It is alſo more black, and of a leaden colour, which ſometimes containeth Silver in it, from whence in the places where it is digged up, they gather that Silver is underneath, and the Miners call it the Cooping, or Covering of Silver. Its maſſes do uſe to cleave to a Stone that is moſt hard, except it contain *fluores*; or have Nitre in it, which maketh the Stones friable. It is found in *England*, and *Miſnia* in the Silver Mines. They uſe to mix it with Tin, that it may confer ſplendor and hardneſs to it, and that being melted it may run more eaſily. They alſo make of it Veſſels of divers ſorts, which are like Silver in colour.

As for the Ore of this Metal, or Semi-metal, which they call *Biſmuth*, or *Wiſmuth*, and our Artificers in *England* Tin-glaſs, I could never hear of any that was gotten in his Majeſties Dominions; and therefore ſhould deſire all ingenious Gentlemen that are inquiſitive after Minerals, and all other perſons that ſeek or dig for Ores, to inquire if any may be heard of or diſcovered in this Nation, for it would be a commodity of great worth, for the Metal is very dear. Neither have I ever been ſo happy, as to be able to procure any of this Ore, and therefore cannot of mine own knowledge give the Reader any ſatisfaction about the properties of it. Neither do I know that much uſe is made of it, in this Nation, except by the Pewterers, from whom we commonly buy it at dear rates; but that there is ſome uſe made of it in ſoldering the many Veſſels, and Utenſils that are made of thoſe thin Plates that are made of Iron, and tinned over, we commonly call it *Crooked-lane Tin*: Neither have I ſeen any Veſſels made of this Metal only, and if they be, they muſt be made by molding or caſting, for of it ſelf it will not abide the hammer.

De Nat. Foſſil. lib 1. p.575.

De Ver. & no. Metal. l.2. p 677.

Agricola numbreth this amongſt Metals, and reckoneth up many places where the Ore is gotten, both in its own Mine, and alſo where it is found among other Metals, much-what after the order before rehearſed, and therefore we ſhall not need to ſay more of it here. And *Rulandus* ſpeaketh but to the ſame purpoſe.

Laſt Will and Teſt. c. 10. p.101, 102.

Of this Metal *Baſilius* writeth thus: Wiſmuth is wrought in its own Mine-ſtone, not quite freed from a protruding Silver, or Tin-ſtone, of an imperfect, pure Quickſilver with Tin-ſalt, and fluid ſilver Sulphur, of a brittle immiſcible earth, partly of a crude fluid Sulphur, partly of a mixed exiccated Sulphur, according as it hath got a matrix, after it was conceived: Then it turneth a baſtard of a brittle nature, eaſily uniteth with Mercury, and is wrought naturally in a twofold form, the one is fluid and metalline, is melted with dry Wood, being mixed with Clay, yieldeth much of white Arſenick. The other is ſmall ſtreaked and ſpiſſie, remaineth an unripe ſubſtance, yields a fixt Sulphur inſtead of Arſenick; both theſe are ſilver Wiſmuth.

Of theſe two fore-going, *Paracelſus* ſaith thus; There is found a twofold Antimony; one vulgar and black, by which Gold is purified, being molten in it. This hath the neareſt affinity with Lead. The other is white, which alſo is called *Magneſia*, and *Biſemutum*. This hath the greateſt affinity with Tin. As for any Medicines drawn forth of this Mineral either by the way of common Chymiſtry, or otherwiſe, I do not know of any.

Cœl.Philoſ. Can.5.p.122.

3. The next we come unto, is that which *Paracelſus* called *Zinetum*, the *Germans* Zinck, and our Artificers Spelter, a Metal that hath not been known unto the Ancients, but may well be ranked among the new Metals. I do not find that *Baſilius* maketh any mention of it, except he name it once, which is all that he doth in all his Works that I have peruſed, to the beſt of my remembrance, unleſs we ſhould imagine (as ſome do) that it ſhould be that Mineral of which he ſaith thus, when he ſpeaketh of Minerals and Metals: Among theſe I happened to get one Mineral, compoſed of many colours, which had many and rare vertues in Medicine, I drew (he ſaith) its ſpiritual Eſſence from it, whereby in few days I cured my diſeaſed Collegiate. Though ſome (and that with more likelihood) do take it to be the *Cevillus* or *Ludus Paracelſi*.

Of the great Stone of the Ancient Philoſophers, Preface.

The moſt that we find of this ſtrange Metal, is that which *Paracelſus* hath recorded of it, whoſe knowledg and experience in Minerals exceeded all other Authors that ever we have ſeen or read.

1. And firſt of this, and *Biſmuth* he ſaith thus; When therefore the Metals are generated after this manner, to wit, when the true metallick flux, and

De Elem. Aq. c.9.p.282.

ductibility, is taken away, and is diſtributed into the ſeven Metals, a certain reſidence doth remain in the Ares, like the births or off-ſprings of the three firſt things. Of this Zinck doth grow, which is a Metal, and not a Metal. And ſo *Biſmuth*, and others like to this, which are partly fluid, partly ductile. But although they a little adhere unto Metals in their flux, notwithſtanding they are nothing but the ſpurious off-ſpring of the Metals, that is to ſay, they are like unto Metals, but are not Metals. Zinck for the greateſt part is the ſpurious off-ſpring of Copper, and Biſmuth of Tin. Of theſe two there are of all others the greateſt dregs and remnants made in the Ares.

De Mineral. Tract. I. p.349.

2. He ſaith further alſo, there is a certain Metal not commonly known as *Zinetum*, or Zinck. It is of a peculiar nature, and ſeed: notwithſtanding many Metals are adulterated in it. This Metal by it ſelf is fluxible, becauſe it is generated of the three fluxible Principles. But it doth not admit malleation, but only fuſion. Its colours are diverſe from other colours, ſo that it is not like to the reſt of the Metals as they grow. This is ſuch a Metal (that he ſaith) that its ultimate or laſt matter is not yet known unto me. For in its propriety it cometh moſt neer of all unto Argent vive. It doth not permit permixtion: nor doth it permit the fabrications of other Metals, but is by it ſelf, or alone.

Chron. Carinth. p.247.

3. He hath a notable paſſage of this Metal, which though the *Latine* Tranſlations have not mentioned what particular Ore it is, but have omitted it, (for what reaſons I know not, except to hide it) yet in the High *Dutch* it is plainly thus, where he ſpeaketh

of the Metals and Minerals that are found in *Carinthia.* There are found alſo certain Mines of the Ore of Zinck, the like whereof *Europe* it ſelf knoweth not. This is a ſingular Metal, and truly admirable by its rarity. But for its vertues in Medicine or Biſmuth either; neither this Author *Helmont*, nor few of the common Chymiſts have ſaid any thing; only we ſhall give the Reader an account what that honourable perſon Mr. *Boyl* doth write of them both. Some modern Chymiſts (as particularly *Glauberus*) have of late prepared remedies not unuſeful out of Zinck, or Spelter. Of the other he ſaith thus; And though Biſmutum have not, that I know, till very lately been uſed, unleſs outwardly, and eſpecially for a Coſmetick, yet the induſtrious Chymiſt *Samuel Cleſſeus*, by Calcination and addition of Spirit of Vinegar, and *Cremor Tartari*, makes two Medicines of it, which he highly extols in the Dropſie; And (to reſerve for another place, what I have tried upon Tin-glaſs) a very expert Chymiſt of my acquaintance, doth by preparing it with common Sublimate (carried up, by which I remember, it hath afforded a very prettily figured body) make it into a Powder (like *Mercurius vitæ*) which he aſſures me he finds in the Doſe of a few grains, to purge very gently, without being at all (as *Mercurius vitæ* is wont to prove violently enough) emetick. I know not what uſe is made of this Spelter, but only that the Braſiers do mix it with Copper, and thereof make their Cement or Soulder, for from them we have it, and that at very dear rates. The Ore of it I have not ſeen, nor as yet could procure, and I ſhould be very glad to hear that any of it could be obtained, or any of it found in *England.*

Of the uſefulneſs of Experimental Philoſophy, part. 2. p. 130.

Ibid. p. 134.

C. Starkey, nat. Explic p. 306.

Pyrotech. aſſerted, p. 148.

I cannot paſs by one thing, which a learned perſon, and a great Chymiſt, now dead, affirms to the World, in theſe words, ſpeaking of *Paracelſus* his *Metallus maſculus*, doth ſay, that it is Spelter, and is the Sulphur *Gluaræ Augurelli*. And in another place ſaith thus; That a Sulphur may be extracted out of Venus, the *Metallus maſculus* (which in a Parentheſis, I tell thee is Zinck) and ſo out of Lead and Tin. But though we might aſſert that the *Metallus maſculus*, and the *Glaura Augurelli* are both one, yet we muſt modeſtly affirm, that Zinck is not the *Metallus maſculus*; for Zinck is not *radix nec pater metallorum*, as the *Metallus primus* is.

4.

De re Metal. l.1.c.21.p.35.

The next is that which *Paracelſus* calleth *Cobaltum*, and in my judgment doth not underſtand it, to be the ſame, that *Encelius*, and many others, make to be the *Cadmia nativa*, the *Lapis æroſus*, or Stone forth of which Copper is drawn, but of another ſort, which yieldeth a new, and unknown kind of Metal, otherwiſe he could not have deſcribed it, as he doth. For of the Copper-ſtone, or *Cadmia nativa*, *Schroderus* ſaith thus; The Cobalt, native Cadmia is metallick, and digged forth of the Earth, and is an earthly Mineral, almoſt black in colour, partaking of Copper and Silver: And is plentifully digged up, not far from *Goſlar*. And that it is of ſo Cauſtical a quality, that it exulcerateth the hands and the feet of the diggers, and is reckoned among Poyſons. But that *Cadmia nativa*, or Copper-ſtone, that we have gotten here in *Cumberland*, is not black; but pretty ſhining, like to a golden Marchaſite, but far more heavy. Of this *Wormius* ſpeaketh to the ſame purpoſe, calling it *Cadmia Metallica*, to diſtinguiſh it from the *Lapis Calaminaris*,

Pharmacop. l.3 c.18.p.123.

Muſ. Worm. l.1.ſect.3. c.10. p.128.

minaris, which he calleth *Cadmia Foſſilis*, of which we ſhall ſay more hereafter. Now *Paracelſus* deſcription is after this order: Further, there is another Metal made of Cobalt, that is melted, and floweth like Zinck, having a peculiar black colour above Lead or Iron, appearing with no ſplendor or metallick ſhining, it is beaten out, and hammered, but not ſo far that it may be fitted for uſe. Neither truly is the laſt matter of this yet found out, nor its preparation; and it is not to be doubted but that the Female and Male are here both joined together as Iron and Steel; and theſe are not beaten forth, but remain as they are of themſelves, until that Art do find forth the ſeparation of them. From whence it is manifeſt, that this Metal, drawn from this that he calleth *Cobalt*, is neither in colour nor other properties like the Metal of Copper that is drawn from the metallick Cadmia, or Copper-ſtone, though they may call it *Cobalt* alſo. And *Rulandus* deſcription of Cobalt ſeemeth to agree to this, from whence (perhaps) he had it, which is thus: Kobolt, or Kobalt, or Collet, is a metallick matter more black than Lead or Iron, ſometimes Aſh-coloured, wanting a metallick colour, yet it is melted and brought into places; therefore it is not fixt, but carrieth away the better Metals with it by ſmoak.

De Mineral. l. Tract. 1. p. 349.

Lex. Chym. p. 271.

5. Concerning native Electrum, that it hath been produced by Nature, but is now accounted by *Pancirollus* as a thing loſt, and therefore he ranks it in the number of his *rerum deperditarum*; and *Salmuth* ſaith, that it was naturally found in the mines, and was of great eſteem with the Ancients, both for its clear ſhining, and for its diſcovery of poiſon. And ſeeing it hath been found in former times, there is no doubt but that ſometimes

Rer. deperdit. Tit. 33. p. 120, 123.

it might be found ſtill, becauſe (however many may be of opinion that Nature decays both in general and in particular) Nature is the ſame that ever it was, and worketh as it did in former days: onely it is want of care and diligence in ſeeking and obſerving, and the covetouſneſs of men that gape after nothing but Silver and Gold, or thoſe things that they may make preſent gain of; ſo that thereby many particular Minerals are neglected, and caſt by, becauſe they know not how to make preſent uſe or profit of them; or becauſe their Ores being but rarely found, they are not known, and therefore thrown by, as hath hapned by ſome others as well as this. Alſo becauſe Art hath found out a way to commix Gold and Silver in ſuch a proportion as to the ſplendor and eye-ſight may ſatisfie, though it want the intrinſical virtue; and ſo that which is native is not ſo much ſought after, as hath hapned in the native Orichalcum, ſeeing that by Art it is now counterfeited. But that it may poſſibly be found at ſome time and places, this inſtance from another Author both of credit and veracity, may beyond exception ſufficiently evince, who ſaith thus: I ſaw alſo a great piece of pure Electrum, of the which Bells, and Apothecaries Morters, and many other ſuch veſſels and inſtruments may be made, as were in old time of the Copper of *Corinth.* This piece of Electrum was of ſuch weight, that I was not only with both my hands unable to lift it from the ground, but alſo not of ſtrength to remove it either one way or other: they affirmed that it weighed more than three hundred pound weight, after eight ounces to the pound; it was found in the houſe of a certain Prince, and left him by his Predeceſſors. And albeit that in the days of the inhabitants

Pet. Martyr. Decad. I. li. 4. p. 27.

tants yet living, ***Electrum*** was no where digged, yet knew they where the Mine thereof was; but our men with much ado could hardly cauſe them to ſhew them the place, they bore them ſuch privy hatred; yet at the length they brought them to the Mine, being ruinate, and ſtopped with ſtones and rubbiſh: it is much eaſier to dig than the Iron Mine, and might be reſtored again, if Miners and other workmen skilful therein were appointed thereto.

6. Of Nat. Bath. c. 9. p. 43, 44.

To theſe we may add another, little written or ſpoken of, but that Doctor *Jorden* ſaith thus of it: Calaem may be reckoned among thoſe, which is a kind of white metalline Cadmia, brought out of the *Eaſt-Indies*, which hath both metalline ingreſſion, and metalline fuſion, but not perfectly malleable. This (if my memory fail me not) is alſo mentioned by *Linſchot* in his Voyages, but the place I remember not. I have much laboured to get ſome of it, but as yet could never compaſs any of it.

7.

There is alſo ſomething ſaid of Bell-metal, that it ſhould be found natural in the bowels of the earth, of which the Author before-cited ſaith thus: Bell-metal is thought to be a mixture of Tin and Copper Ores, as *Kentman* judgeth, and is found in our Tin and Copper Mines in *Cornwal*. As for Granates that hold Metal, we have ſpoken of them before.

CHAP.

CHAP. XXVIII.

Something more of Galena, Lapis Plumbarius, *native Cadmia,* &c. *As alſo of Chryſocolla, or native* Borax, *Cæruleum, native* Blue, *Ærugo, native Green, Talk, Magnes, the Load-ſtone, Hæmatites, the Blood-ſtone, Schiſtus; The Lazul-ſtone, and of Metallary ſtones, and the like.*

1. ALL that we ſhall ſay he reconcerning *Galena, Plumbago, Lapis Plumbarius,* and *Molybdena,* (*Eucelius, Rulandus,* to whom we may adjoin *Wormius,* do make a long diſcourſe, and bring many Arguments to prove that they are all one) is that there is much ſaid to little purpoſe, and that in ſome reſpects they may be taken for all one; ſeeing it is a truth that no Lead Ore is found ſo poor, but that it containeth ſomething of Silver, (as all experience will make good) yet often ſo little that it is not worth the charges of refining; and oftentimes in ſo an extream minute proportion, that it will deceive the beſt and moſt curious Artiſt that doth but try it by ſmall quantities in the Cupel or Teſt. But if the Workman will take a pound of the pooreſt Lead that may be, (that hath not been refined before) and calcine it in an Iron Veſſel until all that can of it be turned to Litharge, then let him take that ſmall quantity, and purifie it upon the Teſt, he then ſhall find it will yield ſome Silver, whoſe quantity in a pound or more of the Lead may ſoon be calculated. And

Vide Eucel. de re Metal. l. 1. c. 34. p. 66. & Ruland. Lex. Alchym. 374. & Muſ. Worm. li. 1. Sect. 3. c. 10. p. 127. Agricol. li. de nat. Foſſil. 10. p. 655.

And therefore the moſt experienced Eſſay-maſters will not uſe any Lead that hath not been calcined into Litharge, and blown up again into Lead, leſt thereby they be deceived in their trials. But however, that in this reſpect they may be accounted all one, in regard that there is none of them but they hold both Lead and Silver, yet notwithſtanding I hold that the main difference lieth in this, that it is to be accounted *Galena* when it holdeth a ſenſible quantity of Silver, or however when it holdeth as much Silver as may make it a Mine Royal: but if it hold no ſenſible quantity of Silver, then it may be called *Plumbago*; and this I wiſh every Teſt-maſter and every Miner ſeriouſly to mind and conſider of.

2. Beſides what we have before ſaid of native *Cadmia*, which we have ſhewed that the Germans call it **Kobalt**, and containeth Copper moſt commonly, ſometimes Copper and Silver, and ſometimes Gold, Silver and Copper. The beſt diſtinction of it is to call it *Cadmia Metallica*, thereby to difference it from the *Lapis Calaminaris*, which the Germans call **Galmei**: It is of yellowiſh colour, and of a more ſoft ſtone, or of the nature of more hard earth. They uſe it to ting Copper into a golden colour, that thereby it may be made artificial Orichalcum. *Wormius* ſaith he had three ſorts of it, one of an Aſh-colour, another rubicund, the third ſomething yellowiſh.

Muſ. Worm. Ut ſupra, p.128.
Vid. Lexicon Alchym. Ruland. p.120, &c

3. For native *Chryſocolla* (for we ſpeak of none elſe here) which by the Greek name ſignifieth as it were the glue of Gold, becauſe its uſe was to glue or cement Gold; the Germans call it **Steingrun, Schifergrun, Bergtgrun**. This Nature produceth in fibres and holes, and it is ſometimes found like to

Muſ. Worm. Ut ſupra.

Sand, ſometimes a metallick matter doth cleave unto it. It is digged up in *Hungaria*, *Bohemia*, at *Goldberg* in *Sileſia*, and in other places. *Rulandus* ſaith, it was gotten in a thouſand places in *Germany*, and might be called *Chryſocolla viride ſciſſile*, as *ærugo* is called *Viride æris raſile*. Lex. Alchym. p. 146.

The native *Chryſocolla* is only in Metals that hold Copper, and is only made out of Copper; and if it be ſometimes found in Gold, Silver, or Lead Mines, the Veins of thoſe Metals are mixed with Copper. Its goodneſs is eſteemed by its colour and ſtrength: for all that which is native is green, ſome to a full green; and by how much more it cometh nearer the greenneſs of the Emerald, by that it is eſteemed better: otherſome is a weaker green, which is the worſt, and there is ſome of a middle ſort. I have ſome native green that was gotten in the creviſes and little holes of ſtone, that ſeemed like unto Cadmia or Copper-ſtones, and were gotten in a Lead Mine, a little diſtant from the Lead Ore, and had a vein or rake of ſtones or Copper Ore of the ſame nature. And great plenty of it might have been got, but that the Workmen ſeeking only for Lead Ore, and knowing no uſe to be made of it, would follow it no longer: but whether it be the native Chryſocolla, or native Ærugo, I am not yet ſatisfied, nor can be certain whether or no they be two different things, or but one; for Authors ſeem to make them two, but ſhew no diſtinction except the names, of which more anon. Muſ. Worm. Ut ſupra, p. 129.

4. Cæruleum or native green, (which is like that which our Women in *England* uſe to make their blue Starch with, and they call it Powder-blue, and is artificial, and made forth of the *Lapis Lazulus*, or *Armenus*)

menus) is found in many ſeveral places, and *Rulandus* reckoneth theſe ſorts.

Lex. Alchym. p. 161.

1. That which is ultramarine, or from *Cyprus*, which is moſt fair, found in an Aſh-coloured earth, and like the beſt ſort, that is factitious.

2. Very famous natural green from *Sneberg*, ſomething cloddy and hollow within, which is digged forth of a white ſandy earth.

3. From *Padua*, which is found in clods of earth of a deep Aſh-colour.

4. Native, from *Thuringia*, which is digged up beſides *Muchel*.

5. Native, copiouſly found adhering to an hard, thin, Aſh-coloured earth.

6. Native, and pure from *Poland*.

7. From *Poland*, with hard ſandy white earth.

8. Found with a rude white ſtone.

9. Native, from *Spain*, in which Gold doth appear.

10. From *Sneberg*, cleaving to rude or bare ſtones.

11. From *Iſlebia* in a Slate-ſtone.

12. Native, from *Goldberg* found with Chryſocolla in a vein of Iron, in a white ſtone that melteth in the fire.

13. Native, from *Sneberg* with Chryſocolla, being pure, ſticking in a white Flint diſtinctly.

14. Native, at *Gieſhubelia* in a Fire-ſtone, out of which Silver is drawn; it is mixed with a concrete green juyce, and ſometimes placed like Girdles or Zones, out of which it flowereth with pleaſantneſs forth of the Vein. *Encelius* tells us, That it was found in the Pits or Mines of *Cyprus*, and that it was found in their Gold and Copper Mines, as at *Lanterberg* in

De re Metal. c. 22. p. 123.

Saxony,

Saxony, at *Hircynia*, and at *Goldberg* in *Sileſia*: And that the beſt ſort of it was found there, and they call it **Schifer blaw**, and that it grew in *Hungaria* and *Lotharingia*. I have gotten good ſtore of this of a pure blue colour, in thoſe ſtones that I mentioned laſt above, that were ſomething like Copper ſtones, pretty pieces almoſt as great as Hazel-Nuts, contained in the holes of the ſtones, that were full of ſuch cavities or holes, and alſo the green ſtuff (which is either Chryſocolla or Ærugo) in ſmall pieces, and contained in leſſer holes. I have been the larger in this particular, becauſe our Engliſh Miners do altogether neglect theſe, and ſuch other like things, as knowing no uſe or profit to be made of them, when doubtleſs they might both be of benefit and good uſe.

5. De re Metal. l. 1. c. 27. p. 53. As for native Ærugo, which the Germans call **Kupffergrune**, or **Spangrune**, I find little of it, only *Eucelius* tells us, it is found in the Metals of *Cyprus*, the ſtones having ſomething of Copper in them, out of which it flowereth, but that this is little, and the beſt, and that it was alſo found in Copper Mines in *Germany*. Whether this and the native Chryſocolla be all one or not, I ſhall not take upon me to determine, but leave it to the experience of others, though I ſhould rather incline to believe that they are but all one.

7. Concerning Talk, there are many opinions among Authors about it, ſome taking it generally, and comprehending under it the *Lapis Specularis*, *Amianthus*, and *Talcum* ſtrictly taken; *Agricola* calls it *Magnetis*, but ſeems to confound it with Mica, Cat-ſilver, or Glimmer; and that deſcription that *Rulandus* gives of it, agreeth rather to Mica, than to that Talk that

we have ſold in ſhops; and therefore we ſhall only take what *Schroderus* and *Wormius* ſay of it, and the former thus: The Talk of the ſhops is like the *Lapis Specularis*, but it is more thin and rough, or full of ſcales, of a greeniſh colour, reſiſting the fire, and fixt. It is called of ſome the ſtare of the earth, and by the Germans **Talck**; there is found alſo red Talk and black, but they are leſs uſed in ſhops. That is thought the beſt which is brought from *Venice*, that from *Muſcovia* is equally as good, that is moſt approved of that is chiefly greeniſh. *Wormius* ſaith thus of it: It is a ſoft ſtone like to the *Lapis Specularis*, to be divided into plates, bending, and variouſly intricate, of a Silvery white colour, bluiſh gray, ſometimes blackiſh, unconquerable by the fire, for it is neither to be melted nor burnt, nor loſeth its colour, except by great violence. It is found in many places of *Germany* and *Norway*, and its kinds are diſtinguiſhed according to its colours. He ſaith he had clods or lumps of white and Silvery Talk brought forth of *Germany*; but the more impure and grayiſh was brought from *Norway*. He alſo had ſome ſmall pieces of a golden colour. There was alſo black brought from *Norway*, which had joined the Ore of Gold with it, that gave great hope of gain. The Talk that I have commonly ſeen and had, is much agreeable to theſe deſcriptions, it being white and Silvery with ſome greeniſhneſs, and may be ſevered or cleſt into ſmall tires or threds, and doth long reſiſt the fire, and hardly to be conſumed by it. It is a good vendible Commodity, and therefore may concern the Miners to take care to enquire and ſearch after, for there is little queſtion but ſome of it may be met withal in ſome of our Mines in *England*.

Phorm. Med. Chym. l. 3. c. 8. p. 42.

Muſ. Worm. l. 1. Sect. 2. c 7. p. 57.

land. *Paracelſus* reckoneth three ſorts, white, red, and black Talk.

7. As for the Magnes or Loadſtone, we mean no further to treat of it here, but as far as may enable our own Country-Miners to know and ſearch after the ſame. *Wormius* deſcribes it thus: It is an hard Stone, ferrugineous, or irony, and blackiſh, which draweth or rejecteth Iron, or another Loadſtone, and ſheweth the quarters of the World. It is found in divers places, for the moſt part in Mines of Iron, from whence alſo it containeth much Iron in it ſelf. For all that body that doth attract, is not the Magnet, but there is in it a Magnetick Vein: Therefore in certain places in *Germany* they draw moſt excellent Iron forth of it. In *Italy* in the mountains of *Viterby*, and in *Ilua* where it is found, outwardly it is of a ruddiſh colour, within when it is broken waxing black, and a little tending to blewiſhneſs though obſcure; in attracting very efficacious, while it is ſmitten it trembleth, being covered with a certain dawn which goeth to the Iron, if it be admoved unto it. Alſo it is digged up in divers places in *Germany*, near the Valley *Joachim*, *Swartzberg*, *Sneberg*, &c. Alſo (he ſaith) they had it brought from *Norway* of great ſtrength, of which he could ſhew ſome. Like this deſcription are thoſe fragments that we buy at the ſhops, as alſo that which we have capped with Steel, and bound with Braſs or Silver, and thoſe round ones that we call Terrella's. Doctor *Merrett* ſaith, That there is of it of good note found in the Rocks of *Dartmoore* in *Devonſhire*, and of worſe ſorts elſewhere. And I have had it from ſome Gentlemen of very great worth, that lately there is found good ſtore of it in the foreſaid County, of very

Muſ. Worm. l. 1. Sect 2. c. 9. p. 62.

excellent force and virtue. And I make ſmall doubt, that ſeeing we have ſo many Mines of Iron-ſtone in his Majeſties Dominions, if the Workmen had skill in knowing of it, and were diligent and obſervant, it might be found in many places; which I commend to all ingenious and laborious Miners.

8. Of this ſtone Hæmatites *Wormius* ſaith, That it is ſo called either becauſe it is of a ſanguineous colour, or elſe being rubbed againſt wet Whetſtones, it yieldeth a bloody colour, or becauſe it is prevalent in ſtanching of blood. It is a ſtone of the colour of coagulated blood, but more obſcure, hard, and indowed with ſtreaks like Antimony; it is cloddy, and ſtayeth bleeding. It ſeemeth to be of a middle nature, betwixt Earth, Stone, and Metal, when it is compacted into a ſtony ſubſtance, from the ſhavings or ſediment which the water hath worn from Ruddle, or ſome red ſtone. It is in divers places in *Germany*, betwixt the Mines of Red Oker or Ruddle and Iron, as in the Valley of *Joachim*, and near *Hildeſheim*; but above the reſt, that which cometh from *Spain* is commended; that which is brought from *Compoſtella* is of an angled figure, having the colour and ſplendor of blackiſh Iron. It is decocted into Iron, and containeth Ruddle in the cavities, ſometimes it is obſerved to attract Iron obſcurely: of this *Rulandus* reckoneth theſe ſorts. Muſ. Worm. l.1. Sect. 2. c.9. p. 64.

1. That which is of a black colour, found at *Goſtaria*, yielding a yellow juice, moſt hard, and is unknown to the ſhops. Lex. Chym. p.250.

2. It is digged up in many places in *Haſſia*, and is of a purple colour, and to be cloven.

3. Very fair is digged up in *Geurg*, and *Anneberg*

of *Salfield*. This the Goldſmiths commend, becauſe it is moſt hard upon the Whetſtone to poliſh Gems. It is black,and ſharp like a Topp. So the moſt that we have from the ſhops is of the aforeſaid figure, and of a bloody or Liver-colour.

9. The next is the ſtone *Schiſtus*, for which I want an Engliſh name, and Authors do diſagree much about it. Some by it underſtand ſome kind of the Amianthus, or the *Lapis Specularis*, or *Alumen Scaiolæ*, or a cleaving ſtone, which they vulgarly call **Quartz**. But (ſaith *Wormius*) I take it with *Agricola* and *Cæſalpinus* to be a certain kind of the Hæmatites, or Blood-ſtone; and *Agricola* would that the name of Schiſtus be attributed unto it, not either that it is eaſie to be cloven, or that it is cloven, but that after a certain manner that it ſeemeth ſo. For by the mutual Compoſition of its parts, which have increaſed ſtraight like wood, it is like to Ammoniack Salt. As well the Schiſtus as the Hæmatites are either like to concreted blood, or to Iron, and then ſometimes ſome of the external parts are of the colour of Saffron. In this at the leaſt it ſeemeth that a difference is ſet, that the Hæmatites or Blood-ſtone is almoſt always in the figure of a clod; but the Schiſtus, either in one part or both,is formed like a Wedge. The ſum is as much as may be gathered from *Agricola*, that he acknowledgeth no difference betwixt them, but that which conſiſteth in the figure.

Muſ. Worm. Ut ſupra.

To this (as near a kin) we may ſubjoin the ſtone called *Smiris*, in the High-Dutch **Smirgel**, and we after the French name call it **Emerg** from its abſterging faculty. It is a ferrugineous or irony ſtone, inclining to blackneſs, ſo very hard, that the Lapidaries do

Muſ. Worm. Ut ſupra. p. 64, 65.

do uſe it to ingrave in Gems, and to poliſh Arms. Becauſe to the watery Touchſtone or Whetſtone it yieldeth a ſanguineous juyce; of ſome it is accounted a certain hard ſpecies of the Hæmatites. It is found in the Iron Mines. Theſe we have enumerated, that all ingenious perſons might ſearch after them; for if we could find any Smiris, or Emery in our own Country, it would be of great profit unto many.

10. *Ut ſupra.* The *Lapis Lazuli*, which the *Germans* call **Laſurſtein**, is an hard ſtone of a blue colour, adorned with little pricks, and veins of a golden colour. It hath great affinity with the *Lapis Armenus*, according to colours: but the *Lapis Armenus* is not ſo hard, neither hath it golden veins, and eaſily yieldeth into Powder and friability. They ſet down two ſorts of it, one induring the force of the fire, the other not. That which is fixed, and doth not change its colour in the fire, is brought forth of the Eaſt, from *Aſia* or *Africa*, and is called *Oriental*, and is known by its fixedneſs. That which is not fixed, is found in certain places of *Germany*, and is of a middle kind betwixt the *Armenus* and *Lazulus*, for this is ſofter, that is harder. I have ſpoken thus much of this Stone, becauſe it is a good Commodity, and ſold dear, and it may be that ſome of it might be found in our Nation. That which I have ſeen of it is of a fine blue colour, interſperſed with little lines, or ſmall ſparks of a pure golden colour, and is very hard: Some have called it the Marchaſite of Gold, and do believe that Gold doth grow in it, and may be drawn forth of it; but I could never yet procure ſo much of the beſt ſort of it, to wit, that which is full of golden ſtreaks, as to make any certain or conſiderable trial of it.

11. For metallary Stones they are of divers ſorts, growing or cleaving to the Metals, ſometimes on one ſide, ſometimes on another, and ſometimes on both, and are as it were the Matrixes, or Coats, wherein the Metals lie incloſed: Forth of which alſo Metals are drawn, or decocted.

Muſ. Worm. l. 1. Sect. 3. c. 11. p. 150.

1. The firſt is the *Saxum Fiſſile*, which I take to be that which we call ſlate, which may be cloven into thin parts, and is of divers colours, as blue, ſometimes blacker, ſometimes whiter, and the like; ſome refer this to a Fire-ſtone, and ſome to other things.

2. The ſecond ſort is that which the *Germans* call **Quartz**, which ſometimes is moſt white, ſometimes a little yellowiſh, ſometimes grayiſh. To this ſometimes ſparks of Gold do adhere.

3. The third is *Spatum*, (for which I know no *Engliſh* word) that is more ſmooth, and hard than the reſt, by ſome it is called *Metallary Marble*. Of this (he ſaith) he had divers kinds brought from the Mines of *Norway*, where Silver was gotten. One that was barren, and contained no Metal nor other Mineral, white, and cut into pieces. Some mixed with Fire-ſtone, or is with barren Galena, or with Galena, Fire-ſtone, and Silver. By which we may diſcern what various mixtures Nature exerciſeth in the Mines.

4. The fourth is *Saxum Corneum*, or Flint, **Horn-ſtein**, which appeareth moſt hard, of the colour of Horn, whoſe parts are ſometimes ſo continuate, that one cannot diſcern one from another, ſometimes conſpicuous by ſome Interſection.

5. *Lapis Arenoſus*, as though compounded of Sand, called **Sandt-ſtein**: this is that which we call Free-

ſtone, ſome of it being of a very ſmall grain, and is hewed for building withal, and ſome of a far coarſer and rougher ſort, and ſome hard, and ſome ſo ſoft, that it may be crumbled with the fingers.

6. That which they call *Mica*, or *Magnetis*, is a metallick body, that doth ſhine in Marbles and Sand, as alſo in Stones, but cannot be ſeparated from them, the *Germans* call it **Katzenſilber**, and **Glimmer**, that is Cat-ſilver, becauſe it ſhineth in the night like the eyes of Cats. Of it (he ſaith) he had ſome ſorts, one alone, not having any admixture, another in a Stone with a Fire-ſtone, a third in Sand. That it is not fixt, but is conſumed with the fire, and is almoſt of no uſe. *Encelius* tells us that it hath the colour of Silver, and is of no uſe, and in the opinion of the Vulgar is conſumed in the fire. But (he ſaith) if we conſider more warily, it is not conſumed, no more than the true Amianthus, but is only purged, and aſſumeth another colour, otherwiſe it is of no worth. I confeſs I know not what this is, nor could ever yet perfectly learn of any perſon, unleſs it ſhould be ſome of thoſe ſilver-coloured Marchaſites or Fire-ſtones, of which we have plenty, that are of a glorious ſhining white colour, but being fired yield only a ſtinking ſmell of Sulphur, and leave ſome black droſs behind them, but are of no uſe at all.

De re Metal. l. 3. c. 29. p. 213.

Chap. XXIX.

Of the Tranſmutation of Metals.

Concerning this great diſpute of the tranſmuting of one Metal into another, we intend not here to demonſtrate the poſſibility of it, for as the Philoſopher ſaid well: *Quæ experimento oculari videntur, probatione non indigent.* Only we ſhall labour to examine, and open the nature of Tranſmutations, and to ſhew ſome ſorts of Tranſmutation, that are common and obvious, and full as ſtrange as this of Metals, and thereby ſhew that it is no ſuch impoſſible or wonderous thing, as many that would ſeem wiſe and learned do labour to make manifeſt. So leaving general Arguments, as either to confirm or confute, we ſhall ſtand upon ſome inſtances that may ſufficiently demonſtrate the way and manner thereof.

And as for Mutation, Tranſmutation, or that which is commonly called Generation, we ſhall not ſtand upon the ſtrict logical definition, which we do not perceive, yet is perfectly known, but rather make a ſearch what the nature of it may be; that hereafter it may be better underſtood and ſought into, yet (we ſuppoſe) that thus much may be granted, that there can be no Generation, but of neceſſity there muſt be Mutation; for though that all Mutations be not Generation, yet muſt every Generation of courſe be a Mutation, and it is moſt certain that no Mutation can be but by motion; ſo that in this the Schools have not far miſſed it (to give them their due, where, and when they deſerve it) that all Generation is ſome kind of Mutation, and ſo muſt needs be a ſpecies of motion: But yet by all this we come not perfectly to know what Generation is in its true nature and intrinſical eſſence and operation, nor the plain and true manner how theſe Mutations are wrought, by the means of motion in or upon matter, but only are left to be puzled with hard terms, and blind notions, as any perſon may very well perceive that ſhall read and ſeriouſly conſider what theſe few Authors quoted in the margent have written upon this ſubject.

Ariſt. 5. Phyſ. c. text. 4. 8. Phyſiol. Jo. Magyri. l. 1. c. 5. Jac. Zabarel. l. de gener. & interit. c. 3, 4, &c.

We might here fall into thoſe ſtrange Mutations that happen in the Animal and Vegetable Kingdom, that appear in the Generation of thoſe things; but that would lead us at too far a diſtance, though they would mightily conduce to open and illuſtrate the matter we have in hand; and therefore we ſhall leave them, as things that have been both learnedly and accurately handled by that learned Phyſician *Sennertus*, *Fabritius ab Aqua pendente*, the incomparable *Johannes Marcus Marci*, in that curious piece of his ſtyled *Idæa Idæarum Operatricium*, by our never-ſufficiently-praiſed Country-man Dr. *Harvey*, in his profound piece *De Generatione*, as laſtly, by that learned Phyſician and Anatomiſt Dr. *Highmore*, in his Treatiſe *Of Generation*, which though little in its bulk, is not little in weight and worth.

But we ſhall contract our ſelves into a cloſer compaſs to fall upon ſome mutations, (or tranſmutations rather) produced by Nature, or Art, that will ſufficiently ſerve to make forth what we intend concerning the Tranſmutation of Metals, only we ſhall premiſe this, That all Tranſmutations are made ſome of theſe three ways, or by two of them, or all joined together.

1. By adding of ſomething to the thing or ſubject to be changed that it had not before.

2. Or by taking away, and ſeparating from the ſubject that is to be changed, that was in it before.

3. Or by reaſon of motion ſo to alter, diſpoſe, and order the contexture of the parts, that thereby it appeareth another thing than what it was before. And either all of theſe, or ſome of them do concur in every tranſmutation, or elſe there cannot be any: Now we ſhall give ſome Inſtances to make good theſe Particulars, and examine the manner of Tranſmutation by them.

And firſt of that Tranſmutation which is produced by Nature, in which Art hath little or nothing to do, as in petrifying of wood, leaves, moſs, graſs, and the like, which is for the moſt part done either by Water or other lapideſcent Juyces, or ſteams turning the forementioned things into a ſtony matter or ſubſtance. The firſt we ſhall name (as being moſt known unto us) is that famous Dropping Well near the ancient Town of *Knaresborough* in the Weſt-riding of *Yorkſhire*, mentioned in our *Brítiſh* Authors, by our learned Antiquary Mr. *Camden*, and of late written by Dr. *Dean*, and Dr. *French*. The latter of which ſaith of it thus; If any ſtick or piece of wood lie in it ſome weeks, it will be candied over with a ſtony whitiſh cruſt, the inward part of the Wood continuing of the ſame nature as before. But any ſoft ſpungie ſubſtance, as moſs, leaves of Trees, *&c.* into which

Yorkſhire Spaw, c. 16. p. 117, 118.

which the Water can enter, will thereby in time become ſeemingly to be of a perfect ſtony nature and hardneſs. Now the cauſe of this petrifying property, as Philoſophers call it, is *ſuccus lapideſcens*, *i. e.* a ſtony matter, which is in its *Principiis ſolutis*, for indeed the *Principia ſoluta* of all things, whether Animals, Vegetables, Metals, or Minerals, are in a liquid form, and are concreted by degrees, by a natural heat ſeparating from them all accidental humidities, and fixing them into their proper ſpecies. When the water with which this *Succus lapideſceus* is mixed, is in part waſted by the Sun and Air, it doth then depoſite it, as being too heavy for it any longer to bear it. And when that is depoſited, and faln down, it doth by a continued addition and concretion in time amount to a conſiderable ſtony moſs, *&c.* From whence we may note,

1. That by his obſervation and judgment, the ſtony ſubſtance bred by the water, is nothing but the appoſition and fixing of the ſmall ſtony particles hid in the water one unto another, which is meerly Aggregation, and ſo comes to increaſe the bulk or quantity by continual addition. And thus far according to this ingenious perſon and learned Chymiſt, here is nothing at all of Tranſmutation, but that the moſs, leaves, *&c.* become ſeemingly of a perfect ſtony nature and hardneſs.

2. Yet if we look a little more warily, we ſhall find not only an Aggregation of theſe ſmall ſtony particles, and an Incruſtation upon the out-ſide of the moſs and leaves, but even that the ſubſtance of the moſs and leaves, and the ſmall atomes of them are meerly petrified as far as our eyes, or the beſt Mi-

Microſcopes can inform us. And though the thicker and greater pieces of Wood, be not in ſo ſhort a time petrified, as are moſs, graſs, and the leaves of Trees, yet in a longer continuance of time, Wood of a conſiderable bulk, will be totally ſtonified both in the Internal and External parts: So that by this Water of the dropping Well, ſtones are not only bred by Aggregation of ſmall ſtony particles, nor Wood and Moſs only cruſted over with a ſtony Concretion, but alſo that the Moſs, Leaves and Wood, are really changed into a ſtony ſubſtance. And though the Explication of the true manner and way how it is done may be occult, and yet require the ſtudy of many Obſervators, and doth not belong to our preſent enquiry, curiouſly to ſearch forth: Yet thus much is evident, that upon the ſuppoſition, that the Moſs, and Leaves, *&c.* and the ſmall parts of them are truly changed into a ſtony nature, that then the aerial part, or the *Globuli ætherei* (as *Carteſius* calls them) are by the entry of the ſtony particles contained in the Water, extruded, and ſo ſeparated. Whereby two of the particulars are made clear; Firſt, that there is ſomething ſeparated from the thing changed that was in it before, and alſo that there was ſomething added, as the ſtony Particles, or petrifying Steams or Atoms that was not there before, and conſequently that there muſt be an alteration of the contexture and poſition of the particles of the body changed. But becauſe the ſtreſs of the matter lies what Tranſmutation is, which we are ſearching after, and yet it may be doubted whether or no there be any real Tranſmutation at all, *quoad naturam, ſed ſolummodò, quoad nos*, as when by a due proportionable commixture of Sand and Aſhes, Glaſs is made, which *quoad nos*, and in relation to our ſight is tranſparent, which neither Sand nor Aſhes are; and yet the Sand and Aſhes in their primitive nature and principles remain as they were, the individual particles of either of them being not changed, as may appear by the reducing them to the ſame Sand and Aſhes that they were before, which may be made manifeſt not only by the Alkaheſt, (only known to Adeptiſts) but alſo by other means that may and can be ſhown by expert Artiſts: And alſo when that Silver is diſſolved in *Aqua fortis*, according to our ſight it is changed, and the water remaineth tranſparent, and the Silver may again be ſeparated from it, as is known unto every expert Goldſmith: it may very well make us doubt whether there be any real Tranſmutation or not, but what is by addition, diminution, or altering of parts. And therefore we ſhall quote ſome more inſtances, omitting that of *Hector Boelius* of the Pond in *Ireland*, that if a piece of Wood be ſtuck down in it, as much of it as is in the earth or mud, is in the ſpace of a year turned into Stone; that part which is in the water, is turned into Iron; and that which is above the water doth remain Wood; ſo that the ſame entire piece is Stone, Iron, and Wood; which were a moſt ſtrange relation, and fit inſtance if true. But though we have had it affirmed by a learned Phyſician that lived long in *Ireland*, and that others do maintain that our Iriſh Stones or Whetſtones are of the ſame petrified Wood, (as the grain or bait would almoſt perſwade) yet becauſe the forecited Author is noted to be fabulous, and much ſuſpected in many things, and it not proved by later Authorities; therefore (I

Hector. Boetii Scot. regn. deſcript. p. 9. Sect. 50.

ſay) we ſhall omit it, and ſo come to ſome of tho that the faithful and Learned *Helmont* hath noted from Authors of better credit, who telleth us; For ſo the hand-glove of *Frederick* the Emperour was petrified in that one part of it that lay wet in the Spring, but the other part being fenced with a ſeal, remained Leather: ſo that not only Herbs, Woods, Bread, Iron, Eggs, Fiſhes, Birds, and Quadrupedes, were by a wonderful Metamorphoſis petrified; but by the teſtimony of *Ambroſius Pareus*, a Child at ripe age was cut out of the Womb petrified, which his friend told him that made Mathematical Inſtruments, that uſed the back of that petrified Child for a Whetſtone; and more to the ſame purpoſe he relateth in the ſame Chapter, from whence amongſt others he draweth theſe Concluſions.

De Lithiaſ. l. c. 1. p. 13.

1. That whereas other ſeeds require that the ſubſtrate, or ſubject matter be reduced into a ſequacious, or an obedient liquor, and ſuſceptible of the ſeed, which they have called the firſt matter of Generation, and do require that alſo that the figure, and all the comelineſs of the precedent Concrete be deſtroyed: yet the petrifying ſeed, the humane figure, being preſerved, without any intervening putrefaction, or diſſolution of the matter, doth petrifie the whole through the whole, to wit, as well the bones as the skin.

2. That the petrifying ſeed doth conſiſt alone in a ſaxeous or ſtony odour or ſteam, which is an incorporeal and inviſible Ferment.

We ſhall not here quarrel with this experienced and Learned Author, but only note theſe two things.

1. That whereas he placeth this petrifying quality in an odour or ſteam, which he maketh inviſible and in-

incorporeal, I take him by incorporeal, not to mean meerly that the ſteam is altogether ſpiritual, as the Schoolmen and Metaphyſicians underſtand, but that it is ſo ſubtile, tenuious and fine, that it is not liable to our ſight; and in regard of other more groſs bodies, may be called and accounted incorporeal.

2. He plainly holdeth forth petrifaction, not only in the ſuperficial parts, but that it is *totum per totum*, as well in the bones as in the skin, not only by incruſtation, or adheſion of the ſtony matter to the external parts, but by a real changing (in Animals) of the bony, ſinewy, muſculous, and fleſhy parts intrinſically and thoroughout, into a ſtony ſubſtance; to verifie which, more Authorities may be added to *Helmont*, as that of *Penſingius hiſtoria infantis*, *in abdomine inventi, & in duritiem lapideam converſi.* And ſomething of this nature in that accurate and ingenious piece of Mr. *Hooks* Micrography, as alſo much of this nature may be ſeen in Mr. *Boyles* Eſſay of firmneſs, and in ſome other places, to which I remit the Reader.

Micrograph. obſerv. 17. p. 107, 108, &c. Vid. Philoſ. Tranſ. n. 6. p. 101.

Now in all this that the Learned *Helmont* hath noted, or the reſt, it will appear that this ſaxeous Odour, or ſeminal Ferment, how thin or fine ſoever it were, is of a bodily nature, and ſo piercing the body to be changed, whether of Animals or other things, as Iron, Eggs, Leather, or the like, it doth add ſome ſuch ſteams and particles as were not there before, and ſo doth augment the quantity or weight, if not both; which was one of the things required to be proved. Again, by the ingreſs (which muſt be by motion) there muſt of neceſſity be a ceſſion of another body, which can be nothing but the Aiery Atoms, or Ætheréal Steams, contained before in the porous parts of the body to be changed, which are thereby extruded and ſeparated; which was another thing to be proved. And as for the third, it neceſſarily follows, that when a ſofter body is changed into an harder, or a more fluid body into a firm, the parts are joined more cloſe together; and however all motion in bodies muſt of neceſſity make a change of the poſition, contexture, and order of the minute or ſmaller parts. By all which we ſhall only urge thus much, That this petrification is as ſtrange as that which the Philoſophers call the Tranſmutation of Metals; as may appear by the comparing of their efficient cauſes, the manner of their operations together, and alſo of their effects. To make which plain, we ſhall here once for all lay down the requiſites, aad manner of metallick Tranſmutation; and ſo as we go, ſhew their accord or diſagreement.

And firſt, in the Philoſophers Tranſmutation of Metals, they have their ſubject which they intend to tranſmute, (to uſe that common word, though truly the thing that they do, is only to maturate and meliorate) which is ſome of the more baſe Metals (as they are commonly ſtiled) for as they never mean to change Gold into Gold, for that would be no change: ſo in the intent of Nature and its Operation, a Stone cannot be ſaid to be changed into a Stone. And in this the Tranſmutation of Metals, and of changing Wood, Moſs, Leaves, Animals, Iron, and the like, into Stone, doth agree that they both have a ſubſtrate, or ſubject matter to work upon, and ſo the one not to be wondered at more than the other: but there are two properties wherein they differ.

1. For firſt, in the petrification wrought by Nature,

ture, the things changed are not always contained under the ſame proxime *genus*, and the thing working the effect of ſtonifying is of a Lapideous or Mineral nature, and (according to common opinion) neither contained within the Animal nor Vegetable Kingdom, and yet are wrought upon by that petrifying agent, when in the Philoſophick Tranſmutation, the thing changed is under the ſame proxime *genus*, with the nature of that which it is changed into, being both of a metallick root and nature, and ſo is leſs wonderful than the change made by Petrification.

2. Secondly, the things wrought upon by the petrifying agent, are more remote from that ſtony nature into which they are changed, whether they be Animals or Vegetables, as having had no prævious Preparation, to fit them for the ſuſception of the Operation of that petrifying power: whereas in the Tranſmutation of Metals, the Metal to be changed is to be made as clean as Art is able to perform, according to that true and certain rule of our Country-man *Ripley*, who ſaith:

> *For who that joineth not the Elixirs, with bodies*
> *made clean,*
> *He woteth not ſykerly what Projection doth mean.*

2. Secondly, And as the agent in the change wrought by Petrification, is (according to the doctrine of *Helmont*) a petrific Seed, conſiſting only in a ſaxeous odour, or inviſible ferment: So the agent in metallick Tranſmutation, is a Seed of an aurifick or argentifick nature, for it is known to all that are Maſters,

12 Gates, p. 185.

De Lithiaſ c. p. 13.

ſters, that the Elixir or ſmall part of that which they call the Philoſophers Stone, or Tincture, hath a ſeminal power, able to produce its like, according as it was ſpecificated by Fermentation. Which is ſufficiently confirmed by that faithful deſcription that the experienced *Polonian* hath given us, who ſaith, *Lapis Philoſophorum, ſeu Tinctura nihil aliud eſt quam aurum in ſupremum digeſtum, nam aurum vulgi eſt ſicut herba ſine ſemine, quando matureſcit producit ſemen, ſic aurum quando matureſcit, dat ſemen ſive Tincturam.* And again, *Aurum poteſt dare fructum & ſemen, in quo ſe multiplicat induſtria ſagacis artificis, qui ſcit naturam promovere, ſed ſi abſq; natura, id velit tentare, errabit.* To which doth agree that often quoted ſaying of *Augurellus.*

No Lum. Chym. Tract. 10. p.330,331.

Theatr.Chym. Vol.3.p.203.

Hordea cui cordi demum ſerit hordea: ne tu
Nunc aliunde pares auri primordia: in auro
Semina ſunt auri, quamvis abſtruſa recedant
Longius, & multo nobis quærenda labore.

So that as they agree in having a ſubject matter to work upon, and in their agents, that they are both of a ſeminal power; ſo there is no cauſe to account the one ſtrange or impoſſible, and the other not, except it be by reaſon that petrifying is more common, and the change of Metals, but ſeldom or rarely ſeen, which though it might ſtagger vulgar brains, yet can be of no moment to a learned and conſiderate mind.

3. Thirdly, They agree in the manner of their Operations, for in the act of Petrification, there is the ſaxeous odour or ſeminal ferment added to the thing

changed, that was not there before, and the airy ſteams or particles are extruded forth of the body changed that were there before, ſo that the Poſition and Contexture of the ſmall Particles of the body changed are thereby altered and changed. So in the Tranſmutation of Metals, there is added ſome ſmall part of the Philoſophers Tincture unto the Metal (as ſuppoſe it Lead, or Quickſilver) that is to be changed: And alſo there is ſomething that is ſeparated from the body changed that was in it before, as leſs or more of that which ſome call the external, ſeparable and combuſtible Sulphur; but *Treviſan* calls it *Scoria-droſſe*, which being indeed of an Heterogeneous and differing nature from the Homogeneous Mercury, did make its ſmall parts that were Homogeneous one to another, that they could not ſo nearly be joined *per minima*, which by the ingreſſion of the ſmall quantity of the Tincture are extruded and ſeparated. But to illuſtrate this, we ſhall give the unqueſtionable teſtimony of *Helmonts* experience, who ſaith, *Cogor credere lapidem aurificum, & agentificum eſſe; quia diſtinctis vicibus manu meâ unius grani pulveris ſuper aliquot mille grana argenti vivi ferventis, projectionem feci, &c.* And that a great multitude ſtanding by, the matter, with the tickling admiration of them all (it ſeems himſelf not excepted) did ſucceed in the fire, as the Books of that Art do promiſe. And that he that firſt gave it him (ſo that it ſeems he had either given a ſecond time, or more, or elſe he had made it himſelf, becauſe he had of divers proportions) was a ſtranger, and but a friend of one nights acquaintance, and had at the leaſt ſo much as was ſufficient to change two hundred thouſand pounds into

Arbor. vitæ. p. 793.

Gold. And that he gave him half (a grain he calls the ſixtieth part of a dram) and from thence 9 ounces of Quickſilver, and $\frac{3}{4}$ were tranſmuted: which was an high proportion and noble exaltation.

Vita æterna. p. 743.

Again, That he had once given him (which differs from the other) the fourth part of a grain, which fourth part of a grain being wrapped in Paper, he projected upon 8 ounces of hot Quickſilver in a Crucible. And forthwith the Quickſilver with a certain noiſe, ſtaid from the flux, and ſetled like a yellow lump or morſel, and after being melted, with the blaſt of the bellows, there was found 8 ounces of pure Gold, wanting eleven grains. Therefore that one grain of that Powder had tranſmuted into the beſt Gold, of Quickſilver equal parts to it ſelf 19186: which was a moſt noble Multiplication exceeding the former.

Demonſtr. Theſ. p. 671.

Again, he confeſſeth that ſometimes, or divers times he had handled it in his hands, and with his eyes ſeen the real Tranſmutation of common vendible Quickſilver, in proportion exceeding in weight the Gold-making Powder ſome thouſands of times; and that it was of colour like Saffron in its Powder, but very ponderous, and ſhining like beaten Glaſs, when it is leſs accurately made into Powder, and that once the fourth part of a grain was given him of it. And this he incloſed in Wax, leſt in throwing it into the Crucible, it might be diſperſed by the ſmoke; which he projected upon a pound of hot Quickſilver, newly bought, and put into a Crucible: And forthwith the Quickſilver, with a little murmuring noiſe, ſtaid from the flux, and ſettled to the bottom like a lump. And that the heat of the Quickſilver was but ſo much as might hinder melted Lead from recongealing. Then by and by the fire being increaſed under the blaſt of the bellows, the Metal was melted, and the melting Pot being turned upwards, he found it to weigh 8 ounces of moſt pure Gold. And a compute being made, a grain of that Powder did convert 19200 grains of impure and volatile Metal, that may be put away with the fire, into pure Gold; only in this there is required a moderate fire of glowing, or burning coals. And this is an higher Multiplication than the former. From all which we may note,

1. That theſe were three ſeveral ſorts of Powders, differing from, or exceeding one another in nobility and vertue.

2. It is probable that in the laſt mentioned projection, he was not punctually acquainted with the quantity upon which he was to project it; otherwiſe he would have caſt it upon leſs than one pound; which produced but 8 ounces, the other 4 being flown, or otherwiſe waſted in the fire.

3. From hence we muſt note, that in projection the metal to be changed, is to be in flux and open, that the Gold-making Powder may the more eaſily have Ingreſſion, and penetrate into the ſmalleſt parts of the Metal to be changed; for *Paracelſus* tells us, that as Water being hardened by cold into Ice, will not receive the Tincture of Saffron in Powder caſt upon it; but when melted into water, eaſily will: ſo the Metal to be changed muſt be in flux motion, and opened by the fire, otherwiſe the Tincture cannot have Ingreſſion nor ſpread it ſelf, and where there is no Ingreſſion there can be no Tranſmutation. Yet here *Helmont* tells, that it need but be eaſily hot, and

Rer. Natur. l.7. p. 97.

not violently to any great degree, but as much as may keep melted Lead from recongealing. And this prævious artificial help, beſides the cleanſing of the Metal to be changed as much as Art can perform, is requiſite in metallick Tranſmutation, though in that wrought by Nature in Vegetables, or Animals, in petrifying of them, there is no ſuch precedent Preparation, nor adjuvant cauſe, as external heat or fire, but the petrifying ſteams, or ſeminal odour, doth effect the thing without ſuch helping Concomitants, ſo that (if duly conſidered) the Work of Nature, without the aſſiſtance of Art, in petrifying of Vegetables, and Animals, is more ſtrange and wonderful than the Tranſmutation of Metals.

4. We may note, That Nature in changing Vegetables or Animals into Stone, doth often work *pedetentim*, and by degrees, as alſo ſometimes ſubitaneouſly and quickly, as may appear by that ſtory of *Helmont*, which he thus relates. About the year 1320. betwixt *Ruſſia* and *Tartaria*, in the altitude of 64 degrees, not far from the Pond or Fen called *Kitaya*, it is read, that an Hord of the people cal'ed *Baſchirdi* with their whole herd of Cattel, their Waggons and Carriages were altogether tranſmuted into Rocks or Stones. And that yet to this day the Men, the Camels, the Horſes, the flock or herd of Cattel, and every other kind of thing that did accompany the Waggons or Carriages, do yet ſtand by an horrible ſpectacle, in the day-light turn'd into Stone, and that this was done in one night, without any preceding putrefaction. The like ſtory (if my memory fail not; for I have not the Author by me) is in *Olaus Magnus*, an Author of good credit and reputation,

De Lithiaſ. c. 1. p. 15.

tation, and the like may be found confirmed by ſome other Writers. Which (if true, and no miracle) ſheweth that this act of petrifying of Vegetables and Animals is ſometimes quick and ſubitaneous, as of one night, only that change of Metals is done in a far leſs time, and therefore may well be ſaid to be an acceleration of the work of Nature by the help of Art.

5. It may very well be believed, that in the changing of Vegetables or Animals into Stone, that the thing changed is of more ponderoſity, and for the moſt part of greater bulk than the thing was of before it was ſo petrified and changed; For ſo we have found in all our trials of Wood, Moſs, Leaves, and the like, ſtonified by the dropping Well neer *Knaresborough*, becauſe that is done by Incruſtation, but whether it happen to be ſo in all other ſorts of Petrification (for doubtleſs there are more ways than one) our experience cannot determine, but muſt leave it to the trial and examination of others. But in metallick Tranſmutation, if the exact degree of the vertue of the Powder tranſmuting be known, and ſo be projected upon a juſt and due proportion, the ponderoſity will not much differ from what the Metal changed was of before, as appeareth by that experiment of *Helmont*'s, where he projected one fourth part of a grain of the Gold-making Powder, upon 8 ounces of hot Quickſilver, and it produced 8 ounces of pure Gold, wanting eleven grains, ſo that here was no great difference in the weight: For reckoning that the 8 ounces of Quickſilver, had the fourth part of a grain added to them, and when changed into pure Gold, had but loſt ten grains and three quarters of a

grain, which muſt be that either the Quickſilver had in it ſo much of combuſtible Sulphur (as *Helmont* in a certain place of his Writings confeſſeth that all common Quickſilver hath in it leſs or more of combuſtible and ſeparable Sulphur) that was ſeparated or waſted away in the fire: or that ſo much of the Homogeneous body of the Quickſilver did evaporate as being made too hot, and either of theſe ways it might have been, though the firſt is moſt certain, that all imperfect Metals have leſs or more ſeparable and combuſtible Sulphur, which in projection is ſeparated and waſted. But howſoever that there be little difference of weight in the metallick body changed from what it was before, yet it always becometh leſs in bulk, and poſſeſſeth leſſer room, or place, as appeareth by this of *Helmont*, that the Quickſilver ſetled with a certain noiſe to the bottom of the Crucible, and ſo became of leſs bulk, and poſſeſſed leſs room. And that this is, and muſt be ſo in all metallick Tranſmutations, is moſt clear, not only from the authority of the Adeptiſts, but from their convincing reaſons, ſhewing that in their Tranſmutation, there is a radical Solution and Penetration of all the ſmall parts or atoms of the Metal to be changed, by the ſubtile penetrability and ingreſſion of their ſo much purified and exalted Tincture, and thereby all things in it whatſoever that are of an Heterogeneous nature, are ſeparated and extruded, and the Homogeneous Particles joined together *per minima* as much as Nature can admit of, and ſo muſt needs be of leſs bulk, and poſſeſs leſs room or place, which is manifeſt in Gold, that is one of the heavieſt bodies in the ſame bulk that Nature doth produce, as being moſt denſe, containing moſt of matter, and having its particles moſt cloſely joined together, that there are few *interſtitiums* or ſpaces for the Air or Æther to enter or poſſeſs, which is manifeſt in its extenſion under the hammer, whereby it will be foliated farther, and be thinner than any other Metal whatſoever; and ſo a baſer Metal changed into Gold, muſt of neceſſity poſſeſs leſs room, and be of leſs bulk.

6. And that we may come a little nearer to manifeſt this great work of Tranſmutation of Metals, we may conſider, that though in petrification by the ſeminal Ordour, or ſaxeous Ferment, it works upon moſt bodies as it finds them, either more ſuſceptible, or more apt to reſiſt, which might render its operation and effects more difficult and ſtrange. But here the matter is rendred more feaſible and facile, not only by a previous cleanſing of the Metal to be changed from its Heterogeneous parts, and gently opening of its body by fuſion in an eaſie fire; but alſo our Learned Country-man *Roger Bacon* doth ſhew plainly that we having nearer Metals unto the more Noble, are excuſed from the more remote: for ſeeing that *Saturn*, *Jupiter* and *Mercury* are more near than *Venus* or *Mars*, we were fooliſh to take the latter, and to leave the former.

Spec. Alchym. c. 7. p. 269.

7. The ancient Philoſophers that were Maſters of this great ſecret of Tranſmutation, and knew it by experience, and had ſeen it with their eyes, took little care of framing methodical Definitions or Deſcriptions of it, as little valuing ſuch trifles and niceties, but contented themſelves with the true underſtanding of

it; and yet to their Diſciples which they termed the Sons of Art, they gave ſufficient hints of the way and manner of it, but ſtill as veiled and obſcured. But I find that *Paracelſus* (however condemned of many for his too dark writing) to have ſaid more of Tranſmutation in general, than the moſt of thoſe that went before him; ſome of which we ſhall here recite, where he ſaith thus: If we ſhall write of the Tranſmutation of all natural things, it is equal and neceſſary, that before all things we firſt ſhew what Tranſmutation is: Secondly, what are the degrees to come unto it: Thirdly, by what means, and after what manner it is done. Therefore Tranſmutation is when a thing loſeth its form, and is ſo altered, that it is altogether unlike its former ſubſtance and form, but aſſumeth another form, another eſſence, another colour, another virtue, another nature or propriety; as if a Metal be made Glaſs or Stone, if a Stone be made a burnt Coal, if Wood be made a Coal, Clay be made a Stone or Brick, a Skin be made Glue, Cloth be made Paper, and many ſuch like: Now though this be far from a Logical Definition, as written by one that is generally believed to be no friend to Logick; yet is it no bad Deſcription of Tranſmutation in general, and may well ſtand uncondemned, unleſs by thoſe that can produce a better: for if the things that he doth inſtance in to be changed be duly conſidered, the moſt of them have incidents in the way and mode of their Tranſmutation, that are as difficult to explicate and declare as the principal things in metallick Tranſmutation. Is it not hard to open the true cauſes how Antimony, that is a metallick body, is *per ſe* (which every

Lib. rer. natur. 7. p 97.

every common Chymiſt can perform) brought into Glaſs, which is a tranſparent body, the matter conſidered, will not be found ſo eaſie? And ſo (if we had leiſure) might be ſaid of ſome of the reſt.

8. And that we may more plainly underſtand the manner of this metallick Tranſmutation, let us a little conſider the virtues and properties which they aſcribe to their Tincture when perfected, becauſe by it the operation is performed: for if the nature of the Agent be well known, the effects that it worketh upon the Patient may be the better perceived; and they are thus enumerated and deſcribed by that ingenious and experienced perſon *Johannes Spagnetus*, who ſaith, There are five proper and neceſſary qualities in the perfect Elixir, that it be fuſile, permanent, penetrating, colouring, and multiplying; it borroweth its Tincture and fixation from the Leaven, its penetration from the Sulphur, its fuſion from Argent-vive, which is the *medium* of conjoyning Tinctures, to wit, of the Ferment and Sulphur; and its multiplicative virtue from the ſpirit infuſed into the Quinteſſence. From whence we may gather not only its virtue and energy, but in ſome meaſure its manner of operation.

Arch. Herm. Can. 125. p. 249.

1. For, firſt, we are to note that all that are properly called Metals, that are to be changed, are fuſile, and apt to be melted, and flow with the force of fire, though ſome more eaſily than others; and if the Tincture which is the efficient changing, were not of a fuſile and flowing nature, it could never mix or conjoin it ſelf with the Metal to be changed; for where there is no ingreſſion, there can be no mutation.

2. That it muſt be permanent and fixed, that is, that the force of the fire cannot make it fly; for otherwiſe it could cauſe no Tranſmutation, for *nihil dat quod non habet*; and by theſe two properties all heedful and conſiderate perſons may eaſily conjecture, from what root it muſt needs originally ariſe, and ſo may truly know the firſt matter.

3. It is of a moſt penetrating nature: for if it were not ſo, the ſmall and homogeneous Atoms of the Metal to be changed could not be pierced, and thereby to be ſo ordered that they may be joined *per minima*, and united together, and thereby to extrude whatſoever is heterogeneous in the Metal to be changed.

4. It hath alſo the property of colouring, being indeed the Sulphur, or fire of Nature, from whence all colours do ariſe; and mixing it ſelf with the metallick Mercury of the body, or Metal to be changed, which radically in all Metals is one and the ſame, it becometh one with it as ariſing from the ſame root; and ſo by the help of Art accelerateth the work of Nature, and doth that in a ſhort time, that Nature cannot perform in many hundred of years, as ſaith the learned Philoſopher in theſe words: *Et hæc eſt auri forma, ſummum & optimum, quod ad metallicam naturam ſpectat. Si itaque pura iſtiuſmodi forma, quæ per artem, mediante natura, præparari poteſt, imperfectis Metallis addatur, tunc impurum imperfectorum Metallorum ſuperatur. Non enim impurum, ſed pura materia illi eſt ſimilis: Prima ſiquidem eſt forma ad quam materia iſta facta fuit. Idcircò par cum pari tempore incomprehenſibili conjungitur, impurum ſeparant, quaſi*

Muſ. Herm. tract. de lap. c. 7. p. 418.

dicant: An tu veniſti, quod meum eſt, & quod ad me ſpectat?

5. It hath a power to multiply the virtue, but not the quantity; and having theſe rare qualities, it is no ſuch wonder that it ſhould work ſuch effects upon the more imperfect metallick bodies.

9. And that we may more clearly apprehend the Nature of this Tranſmutation, we muſt conſider ſome of their Maxims; which though by many ſlighted, yet do they hold forth the certain and abſolute truth:

1. As firſt, that of *Bacon*, which they all allow of as the Baſis of all Philoſophick verity, which is this, ſpeaking of Sulphur or Natures Fire, and Mercury natural or radical moiſture, he ſaith, *Sed ex prædictis duobus fiant Metalla cuncta, & nihil eis adhæret, nec eis conjungitur, nec ea tranſmutat, niſi quod ex illis eſt.* Which is a golden ſentence, containing both truth and plainneſs to thoſe that will rightly conſider, and underſtand it.

Spec. Alchym. c. 3. p. 260.

2. Another is this of the ſame Author: *Sed dico quòd natura ſemper propoſuit, & contendit ad perfectionem auri. Sed accidentia diverſa ſupervenientia transformavit metalla, ſicut in multis invenitur Philoſophorum libris ſatis apertè.*

Ibid. c. 2. p. 258

3. A third is this: *Eſt itaque omnibus in Metallis verus Mercurius, rectumque Sulphur, æque tam in imperfectis, quam perfectis Metallis: Saltim contaminatus, & impurus factus eſt in imperfectis Metallis, & quæ ſola perfecta maturatione deſtituuntur. Et ex iiſdem cauſis ad aurum, argentumque redigi poſſunt*, h. e. *ut ab aurea, vel argentea natura, quæ in illis eſt, ſeparetur im-*

Muſ. Herm. c. 2. p. 41

puritas, qua cum inquinata fuerant, & forma auri, vel argenti iiſdem ingeratur.

4. A fourth is, That all Metals are *in ſuo interiori*, Gold, Silver, and Mercury, and that metallick Mercury can no ways be deſtroyed, or otherwiſe the Art of Tranſmutation were utterly falſe, which is certain, true, and moſt true.

10. From all this we may plainly gather what Tranſmutation of Metals is, and how it is wrought: So that if Metals be in their root all of one Mercurial and Homogeneous nature, and that there be perfect Sulphur and Mercury equally as well in the imperfect as perfect Metals, then muſt their Tranſmutation be eaſie; for then the Heterogeneous matter, or combuſtible Sulphur; Scoria, or Droſs, being removed, and ſome of the Tincture added, the parts are moſt cloſely joined, and ſo united *per minima*, and tinged, by which means they are maturated in a ſhort time by the help of Art, that Nature could not perform in many years. So that all metallick Mercury wants nothing of the degrees and nature of Gold; but removing of its Heterogeneous parts, and the adding ſomething more of the fire of Nature, and then it becomes moſt denſe, and to have all the requiſites that are neceſſary to Gold. Agreeable to what we ſay here, is the opinion of an ingenious perſon, who ſaith thus: To conclude, I ſhall preſume to give you ſome of my thoughts concerning the ſo much diſcourſed-of Tranſmutation of Metals; concerning which I am of opinion, that the change is erroneouſly apprehended by many, imagining that the whole imperfect Metal is totally transformed into the more perfect

Phil. Tranſ. n. 41. p. 813.

perfect by the ſubſtance mixed with it; whereas the mixture added to the melted Metal, joins it ſelf (as I conceive) to thoſe parts, which being Homogeneal, ſymbolize together with the nature of the more perfect, whereby the pure metalline parts are ſeparated from the other Heterogeneal impure Sulphurs; which, together with other cauſes, did hinder Nature in the Mine from concocting that ſubſtance into the perfecter Metal.

2. A ſecond inſtance that we ſhall give, is, That divers Vitriolate Waters do change Iron put into them into Copper, which *Helmont* doth deny to be any Tranſmutation, and ſaith thus: But that Vitriol-bearing Juice is thought to change Iron into Copper, the Mine-men themſelves not acknowledging the deluſion, becauſe that the ſucceeding Atoms of the Copper do fill up the place of the Iron that was waſted; neither regarding that as Copper doth render or make Silver diſſolved in *Aqua fortis*, that otherwiſe was inviſible, to appear to the view, and be corporeal. So that it is the propriety of Iron diſſolved in the Vitriol to manifeſt the Copper by drawing it to it ſelf, and together in the ſame act, that the Iron it ſelf is diſſolved, and doth vaniſh in the Fountain. My Witneſſes (he ſaith) are the Fountains themſelves; becauſe verily the Vitriolate Waters are far more poor in Copper than they were before the Iron diſſolved in them, and the Copper thereby recovered from them. Therefore to wit verily out of the very Fountain (where it

De Spadan. font. l. paradox. 3. p.692.

it is often continued, the flux of new Copper doth fail in the Pit or Spring) the putatitious Tranſmutation of Iron doth otherwiſe not happen. The manner of doing of which in the Mines of *Hungaria*, called *Herrengrundt*, *Athanaſius Kircher* doth thus deſcribe: They take ruſty Iron that is unprofitable, as the remainder of various and old inſtruments uſed in Houſes, and being put into the Furnace and made hot, they are upon the Anvile beaten forth into moſt thin plates. This being done, they put theſe plates into the bottom of Vitriolate Water, which doth flow in the moſt deep Pits of the Mines; and being put there, they leave them for certain months. And the due time ended, they come to the Pit, and find the plates to be gone (or changed) into a yellowiſh ſtuff, like unto a ſoft plaiſter, and theſe expoſed to the Air and Winds, is hardned into Copper of the beſt account. And it is ſo uſed at *Neoſel* in *Hungaria*: Therefore it is queſtioned whether this be a true Tranſmutation of Iron into Copper, or not. But I ſay that here true Tranſmutation is not at all given, ſeeing that all the whole Iron is not changed into the ſubſtance of the Copper, but by accident only, I do explain my ſelf. For ſeeing that in Vitriol infinite Copperiſh Corpuſcles do inexiſt, and as thoſe have the greateſt ſympathy with Iron, ſo that alſo it cometh to paſs, that forthwith they flow unto the Iron, and do moſt intimately inſinuate themſelves into its pores; but ſeeing that they abound with Spirits of great Acrimony, from hence being inſinuated into the Iron,

Mund. Subter. l. 10. Sect 4. c. 10 p. 223, 224

Iron, forthwith they begin to corrode it, ſo far, that all the fatneſs of the Iron being conſumed, the irony ſubſtance being diſſolved, doth paſs into duſt, or a ruſty powder, the Vitriolate Corpuſcules ſubſtituting themſelves into the place of the Iron being conſumed, and the native particles both of the Iron and Vitriolate Water are conglutinated into one maſs, which firſt truly is ſoft within the Water, but being expoſed unto the more free Air, the wind and beams of the Sun are indurated into perfect Copper, and by this means it is made the ſame thing that it was before: before verily by the diſperſion of its Corpuſcles in the waters, now by the union of the ſame attracted from the Iron. But if here were given a true Tranſmutation, nothing of the Iron ſhould remain after. But experience teacheth, that ſo much of the irony ruſt doth remain, almoſt as much as the irony maſs did weigh before. And after he ſheweth an experiment, by a rod or thread of Iron put into ſome of this Vitriolate Water ſent him forth of *Hungary*, in this order: I (he ſaith) put an Iron thread into a Viol full of this water, which in the ſpace of three days was all conſumed, a certain ſoft matter remaining in the bottom, which ſeparated from the Droſs, did yield pure Copper; but the Droſs remaining, did almoſt come to the weight of the thread of Iron; ſo that from hence no man need further doubt of this matter. Thus far the experience and opinions of theſe two Learned perſons touching this kind of change, which they will not allow to be a true Tranſmutation, from whence we ſhall move ſome conſiderable Obſervations, and ſubmit them to the judgment of thoſe that have Learning and leiſure to examine the pertinency and validity of them.

1. And firſt, if this (in their ſenſe) be not a true mutation, yet of neceſſity it is an apparent one: for the Iron not only to ſenſe had in it the requiſites that are accounted proper to that Metal, but alſo really had that which all account the properties of that Metal, as to indure ignition, extenſion by the hammer, and fabrication into inſtruments, which by being brought into Copper, hath not only a more glorious colour than that of Iron, but will indure ignition even to fuſion, and that more eaſily than any Iron, and is become more extenſible than Iron, and admitteth of more eaſie fabrication into inſtruments. So that this change, (of what ſort ſoever it be taken to be) is a meliorating of the thing, a graduating and exalting of it both in intrinſick and extrinſick virtue, the metallick root or nature ſtill remaining. So when the Philoſophers mention the Tranſmutation of Metals, as the changing of Lead or Quickſilver into Gold or Silver, they do but underſtand a bettering, exalting, and graduating of them, the metallick root ſtill remaining: ſo that there is no ſuch great difference as many ignorantly do conceive and imagine.

2. Secondly, if they mean (as they ſeem to hold forth) that no Tranſmutation is true, but where all the Atoms and Corpuſcles of the Body

to be changed, are every and all of them tranſmuted, without ſeparating of any of them, or adding any thing unto them, then we muſt ſay, that (as far as we either know or underſtand) few ſuch Tranſmutations will be found in *rerum natura*, brought to paſs either by Nature or Art. And for the metallick change that the Philoſophers ſpeak of, they never held that all the Atoms or Particles of Lead and Mercury are tranſmuted into Sol or Lune, but that the Homogeneous parts onely are, and the Heterogeneous parts ſeparated by the addition of ſome part of their Noble Stone, which is not much differing from this mutation of Iron into Copper.

3. We may conſider the manner how this change is done, and that is by taking it for granted, that in the Iron before it be changed, there are ſtore of Corpuſcles of Copper, as alſo in the Vitriolate Water, and the Water by its Acrimony corroding the Iron, and thereby ſeparating the Atoms of the Iron, thoſe of the nature of Copper reſiding in the ſaid Water, do ſubſtitute themſelves in the place of the Atoms of Iron, being ſeparated; and ſo being Atoms of a congruous Figure, Size, and other Properties, do eaſily couple themſelves together, as being Homogeneal, and refuſing others as of a diſagreeing nature. So the Maſters do hold that their Stone when exalted and prepared to the red, is *aurum intenſum, exuberatum & animatum*, as being indeed brought and wrought from a Golden Seed;

and that the Homogeneous Mercury of all Metals, is *in ſuo interiori* of a golden nature, theſe two eaſily unite moſt cloſely together, and refuſe union with any Heterogeneous body, and ſo the manner of both theſe changes are alike.

4. It would be worth labour to examine the certainty, whether all Iron, or the Ore from whence it is drawn, have ſomething of the corpuſcles of Copper in it, and (if poſſible) in what proportion: That thereby it may be conſidered whether the atoms of Copper be in the Iron, and the atoms of Iron in the Copper, by accidental commixture, or that they come to be ſo by progreſſive Generation. And then it may be conſidered, that where there is particles of Copper and Iron mixt in one body, which ſeemeth to be Iron, and to which we give that denomination, be when it will, or its Ore is found ſo, in its aſcenſion or deſcenſion, as the Mineraliſts ſpeak, that is, whether in continuance of time more Copper would increaſe and grow in it, or that in length of time the Copper Atoms would decay or grow into Iron? A Quærie that may be neceſſary for all Lovers of Mineral knowledge.

5. There is a paſſage in that profound, though dark piece, written by *Paracelſus*, which is commonly called *Cælum Philoſophorum*, or *Liber Vexationum*, though ſome of great judgment call it *Liber Fixationum*, which here may well Can. 1 p. 121. be conſidered of, and that is this; *Omnia ſunt in omnibus occultata. Unum ex ipſis omnibus eſt occultator eorum, & corporeum vas, extrinſecum, viſibile,*

ſibile, & mobile. This hint with divers others, in that obſcure and ænigmatical Writing, though not regarded by many, that are ſo idle and lazy, that they will not take pains to break the hard ſhell, thereby to gain the precious kernel, not minding that *Roſa non naſcitur ſine ſpinis*, and that *Dii ſua bona laboribus vendunt*, do ſufficiently ſhew, that the nature of Metals is not yet perfectly underſtood. And to me by this he ſeemeth to intimate that all Metals are hid in all Metals, and that one is the hider of them. And therefore the queſtion pertinent to this caſe, will be, whether the Iron doth hide the Copper, or the Copper the Iron, and ſo of other Metals; which we ſhall not decide, but leave it to the judgment and trial of others.

A third Inſtance that we ſhall give, is in an artificial Tranſmutation (if we may call it ſo) and that is of Quickſilver, which is a fluid, open and volatile metallick body, and yet is and may be by Art brought into a firm, cloſe and fixed body, as *Helmont* declareth thus at large. De Febrib. c. 14. p. 52. There is alſo the Purgation *Diuceltateſſon, quæ Podagram non minùs, quam febres radicitus curat. Ejuſq; arcanum corallinum vocatur, quod paratur ex eſſentia auri Horizontalis, hoc modo. A Mercurio vulgo venali, abſtrahe liquorem Alkaheſt, cujus meminit* 2. de viribus membrorum, c. de hepate. *Quod fit unius horæ quadrante. Nam, inquit Raymundus, aſtantibus amicis & præſente Rege, coagulavi argentum vivum, & nemo præter Regem, ſcivit modum. In quâ coagulati-*

one iſtud eſt ſingulare. Quod liquor Alkaheſt idem numero, pondere & activitate tantum valet milleſima actione, quantum primâ. Quia agit ſine reactione patientis. Mercurio igitur ſic coagulato, abſq; ullâ coagulantis remanentia, fac indè pulverem minutum, & deſtilla ab illo quinies aquam ab albuminibus onorum deſtillatam, atq; Sulphur Mercurii, quod per ſui præfatam coagulationem foras deductum eſt, fiet rubicundum inſtar coralli: & quanquam fœteat aqua albuminum, tamen iſte pulvis dulcis eſt, fixus, ferens omnem follium ignem, nec perit in plumbi examine. Spoliatur tamen virtute medicâ, dum in album metallum reducitur. A relation of this notable Experiment and moſt ſtrange Mutation may alſo be found in the Theory of *Raymund Lully* the 87. Chapter, which the learned Reader may conſult and conſider of.

But from hence we ſhall obſerve theſe few things.

1. That this ſeemeth to be a more ſtrange mutation than any other we can meet with, for by this the common Mercury, an open, fluid, tremulous and volatile body, is made a ſhut, firm, ſetled and fixed body, even to abide all the fire of the Bellows, and not to periſh in the trial of Lead, which is all that Silver will endure.

2. Here is nothing at all added unto it, but which is again wholly ſeparated from it, for the Alkaheſt is drawn of the ſame in number, weight and activity, leaving not the leaſt atome remain-

ing with the Mercury: Whereas in the Tranſmutation of Metals by the Elixir, the part of the Powder projected doth remain inſeparably with the Metal changed, ſo that of the two, this ect of the liquor Alkaheſt upon the Mercury is more ſtrange than that of the Elixir upon another Metal.

3. They agree in this, that in the Tranſmutation of Metals by the Elixir, the extraneous Sulphur, and Heterogeneous parts (which in quantity leſs or more are in all Metals) are removed and ſeparated, and ſo in the fixing of the Mercury the extraneous Sulphur, is extroverted and turned to the outſide, by the operation of the Alkaheſt, which Sulphur containeth in it the Medical virtue, which by melting down is waſted, conſumed, or ſeparated, and ſo the change in both is made by ſeparating ſomething from the body changed, that was in it before.

4. By this it is manifeſt that in both theſe Mutations, the Mercury by the Alkaheſt, and ſome other Metal by the Elixir, both after the change become of leſs weight than they were before, according to the quantity of the Heterogeneous parts ſeparated from them.

5. Laſtly, The Mercury is fixed by having the extraneous Sulphur thruſt from betwixt the Homogeneous atomes of the Mercury, and thereby they become more cloſely united *per minima*, which is the cauſe, or rather the fixation it ſelf:

and the Tranſmutation of imperfect Metals is not only performed by the Extruſion and Separation of their combuſtible Sulphur, whereby their parts may lie more cloſely together, but alſo by the perfect union of the Powder projected, with the Mercury of the Metal changed, being both of one radical nature, and of a ſymbolizing and homogeneous quality and condition.

FINIS.

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Desmond Shaw Cambridge 1990